Improving the Globe at Night Campaign For Present and Future Participants

Sophie McGrady, CIT

PROJECT INFORMATION

My name is Sophie McGrady, and this summer I worked with Dr. Connie Walker and Elliot Kiesel, a graduate student working with Dr. Walker, to improve the current Globe at Night citizen scientist campaign and prepare for future campaigns. Dr. Walker is a scientist at the National Optical Astronomy Observatory (NOAO). Dr. Walker specializes in the education and public outreach sector of the NOAO and promotes various science education programs by, in part, holding professional development events for educators, and developing curricula to be used within such programs. Dr. Walker is also the director of the Globe at Night campaign.

The Globe at Night campaign has been held each year since 2006, giving individuals around the world the opportunity to collect light pollution readings within their communities. Such light pollution readings are used to better understand the different levels of light pollution existent around the world. Additionally, as light pollution is a relatively new topic in terms of research being done to understand it, this information collected will benefit future research endeavors investigating the effect of light pollution on areas such as health, wildlife, and energy consumption.

What makes the Globe at Night campaign exciting to work with is its availability to the larger public. An individual need not be a scientist to participate. Any individual around the world can step outside and look at the night sky above them. After comparing what she may see to the star charts provided by the campaign, the individual is able to record how much light pollution is in her area of her community.
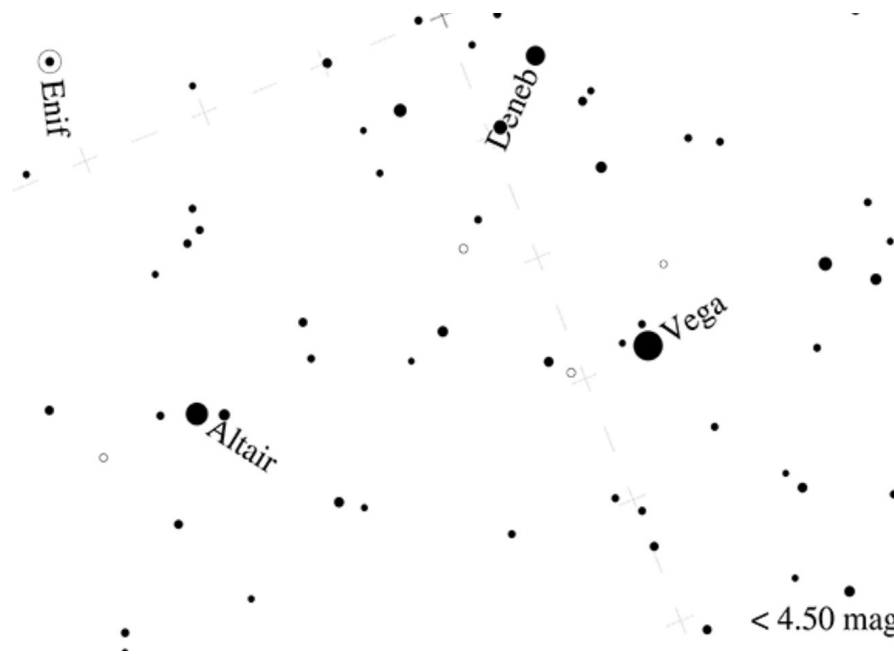

Figure 1: An example of one of the star charts provided to participants of the Globe at Night campaigns. Source: Globe at Night website.[1]

My work with the Globe at Night campaign was not inherently research based, as I was not collecting any measurements or data. However, I still learned quite a lot. As my role in helping out with this campaign included both programming and design opportunities, I was able

---

[1] https://www.globeatnight.org/webapp/

to leverage skills I have gained during the academic year, as well as develop additional skills through interacting with a global campaign.

INTERNSHIP ROLE

As my summer project was not strictly research-based, the terms of my role are more loose than that of typical internships. Instead, I was able to lend a hand across multiple parts of the campaign wherever needed. For the beginning of the project, I acted as a visual editor for the campaign website. I served as a third party point of view so I could give Dr. Walker insight on how individuals might see the website when looking at it for the first time. This task included reviewing the website's current visuals and making notes of which visuals may need to be updated or removed.

However, after looking through the website a few times, I ended up also marking down where additional visuals may be helpful. I then gave suggestions for the kinds of visuals that might be helpful to the website's overall appeal. In certain areas, I thought a simple image of a clear dark sky would help break up larger portions of text while continuing to engage and intrigue the reader. However, in other sections, I proposed including visuals that could directly illustrate the information being described. For example, there was a section about the main three kinds of light pollution: light trespass, glare, and sky gow. The section described these kinds in text only. I suggested including images of the different types so readers could visualize how the three differ from one another. After a quick search on the Internet, I actually found a Globe at Night slide doing exactly this. In my notes to Dr. Walker, I pointed out that the campaign could use the images below by taking each one and pairing it with its verbal definition.
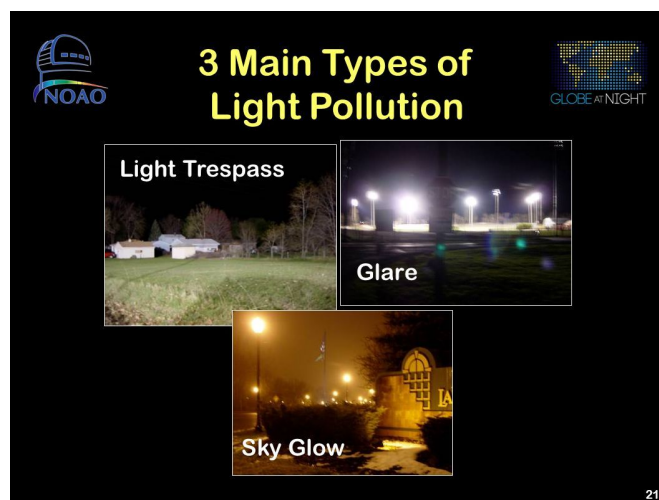
Figure 2: Pictures of the three main kinds of light pollution. It may be helpful for each image to be paired with its definition on the Globe at Night website.[2]

Once I had completed my visual review of the website, I began helping with a subprogram of the Globe at Night campaign: the "Adopt-a-Street" program. The program allows individuals to coordinate a community-driven effort to collect more cohesive light pollution readings in a town or city. In order to help with this program, I looked over its webpage and rewrote and rearranged the information on the page. I rewrote the directions that are presented to individuals interested in joining the "Adopt-a-Street" program to be easier to understand and more concise. In addition to rewriting the directions, I posed some clarifying questions for Dr. Walker about the program.

One aspect of the program that caught my attention was the fact that it was asking individuals to walk along major streets at night. I became concerned for the safety of

---

[2] Though the Globe at Night logo appears on the image, this image was not taken from the website. This is a single slide taken from the Internet: https://slideplayer.com/slide/4316/1/images/21/3+Main+Types+of+Light+Pollution+Light+Trespass+Glare+Sky+Glow.jpg

participants, and I tried to include more cautionary wording within the directions so that safety is more clearly impressed upon a participant. I also brought up my concern with Dr. Walker, so that she was also aware of those specific wording changes that I included.

After working on the "Adopt-a-Street" program, my role in my summer project became more technical, and I began assisting Elliot Kiesel, the graduate student who has been working with Dr. Walker with some of the code that helps the Globe at Night campaign run each year. The code can be separated into two categories: determining the correct dates for the campaign each year and updating the activity guides that help participants understand how to participate in the campaign. Kiesel had already written this code, so I was able to help with improving said code in a number of different ways.

First, I went through all of the existing code and wrote in comments to both help myself become better acquainted with the code and make the code easier to understand for people who may be looking at this code in the future. For the most part, I commented where there were chunks of code that I had to read over a few times to understand the function of the lines. However, I also included comments where there were variables or modules that I had to look up the meanings of or that I had to look at the rest of the code to understand them.

Once I had finished commenting the code, I moved onto a more concrete task involving the code. This is also the part of the summer project I will be continuing even after this course concludes on August 7th, 2020. This task includes creating a graphical interface for the existing code. As certain variables need to be updated every year for the campaign (dates, constellation names, etc.), it is preferable to have a way to make those changes without actually going into the

code and editing variables, especially if someone without much coding experience needs to run the code.

As I am still in the early stages of this task, I have only done planning. I have made a list of variables that will need to be updated every year and therefore included in the design of the graphical interface. Additionally, I have begun looking into which modules or libraries would be the best for creating the interface. I have also started brainstorming the layout and design that will create a simple and easy to use final product. As I continue this project though August, I hope to continue to build the framework for the interface so it can be embedded within the existing code.

EXPERIENCE DESCRIPTION

Overall, I found this summer project to be a positive experience and a great chance to learn more about the Globe at Night campaign. Both Dr. Connie Walker and Elliot Kiesel were very accommodating and helpful in any of the tasks I completed. Throughout the project, I was also working a full-time job, and both Dr. Walker and Kiesel were understanding.

I also enjoyed being able to look at the campaign from a design perspective both for the visuals and the code. I was able to apply a lot of the skills I have developed during the academic year such as how to present data efficiently and effectively as well as how to code Python in clear and powerful ways.

If I were to change anything about the summer project, I would have wanted to start sooner. As Dr. Walker has been juggling many wonderful and educational events and programs, we were not able to truly start until about three weeks before the end of this course. I think it

would have been ideal to be able to finish the project by the end of the course. However, I am happy to continue through August as I know I will finish with valuable take-aways.

KNOWLEDGE GAINED

When coming into this course and summer project, I was not quite sure what I wanted to get out of the experience besides being able to code. Now that I have gone through the course and most of the summer project, I can now see that I was able to learn more about coding as well as the importance of design, another area I am interested in, to the success of a campaign. So though I was not sure what to expect from this summer project, I am glad I was able to learn about a few different areas I am interested in.

When working on my visual reviews of the website and how to best present information to an audience that may be new to the topic of light pollution, I was able to learn more about how a simple addition of a visual can make written information more engaging. When looking at the website for outdated visuals, I found myself paying more attention to the absence of them. While I have already learned about the importance of visuals in classes I have taken, it was interesting to see that adding just a few was a possible answer to some of the problems the website was facing. Additionally, when I proposed images to include in the website, they were not always images that related to the information being presented. Instead, I suggested including images of clear dark skies in certain areas for example, to simply preserve the overall focus of the campaign. That was an unexpected result of my visual reviews, but interesting nonetheless.

Figure 3: An example of an image that may help break up the information on the Globe at Night website. Though not containing any information, the image is a beautiful example of a clear dark sky, the driving force behind the campaign.[3]

On the coding side of the summer project, I learned a lot about Python modules and libraries I was unfamiliar with. For example, in order to calculate the correct dates for the campaign each year, the code used ephem, a Python package that can make very precise astronomical calculations. I was not aware of this package, and it was very interesting to see the different capabilities of said package. Ephem can track the sun and moon as well as give specific information about what celestial bodies are above certain cities from around the world. I also was able to see Python's ability to access and edit Word documents. Though seemingly simple, I was

---

[3] After searching up images of clear dark skies on the internet, I was able to come across this image. Though seemingly arbitrary, I feel like this image perfectly captures the impactful nature of a clear dark sky. https://www.irishnews.com/picturesarchive/irishnews/irishnews/2020/04/22/111222846-3ee95011-88a8-43df-a0cd-6be08ae91a5d.jpg

unaware of this function. I found it quite exciting that you do not have to open up a Word

document and add text or paragraphs yourself if you are using Python.

TIMELINE

Date	Time (hours)	Task
July 12	2	Write up research proposal
July 12	2	Begin reviewing the Globe at Night website and making my first round of notes. This includes looking at visuals that may need to be updated as well as thinking of visuals that may need to be added
July 13	1	Edit research proposal
July 14	2	Go over the website again and make notes/edit existing notes. When reviewing something in order to make edits, I like to utilize multiple viewing sessions so I can keep looking with fresh eyes so I don't miss anything
July 15	2	Review my visual notes on the website and edit the information. I want to make sure the information is clear and the tone is respectful
July 16	1	Final edits for my visual notes
July 16	3	Begin rewriting the "Adopt-a-Street" directions. Look at the wording as well as the structure of the entire web page. Do the directions make sense? Are the objectives clear and easy to read?
July 17	0	Send the webiste visual notes to Dr. Walker
July 19	2	Write up research update 1
July 19	1	Set up my GitHub account in preparation for working on the Globe at Night code with Elliot Kiesel. Additionally, go through some of the GitHub tutorials to become more familiar with the structure of the website as I have not used GitHub before.
July 23	1	Finish rewriting the "Adopt-a-Street" directions. Additionally, format my notes about the webiste in general for Dr. Walker. Send directions to Dr. Walker.
July 25	1	Edit research update 1
July 25	2	Begin commenting the Globe at Night code. Begin with the code that updates the activity guides each year. Read through code a few times to understand the functions of each chunk.
July 26	1	Continue commenting the Globe at Night code. Go over the code that updates the activity guides. Make sure the comments are accurate and make sense.
July 27	1	Move onto commenting the code that calculates the dates for the campaign each year. This code includes some unfamiliar modules. Look up modules to better understand the code as a whole.
July 27	1	Graphical interface: create a list of variables that need to be changed every year in order to update the activity guides
July 28	2	Write up research udate 2 and edit
July 29	0.5	Record research roundtable discussion
July 30	1	Graphical interface: research different modules/libraries that may be useful in creating a graphical interface

https://docs.google.com/spreadsheets/d/158us2GzuJZvGF-PUCFFZJP-jy9GTvPQ7rNxHLP5Mh6A/edit?usp=sharing