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Astronomy through the window

Discovering the Universe in lockdown

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Abstract. In 2020, our post-modern lifestyle was partly restrained by the rise of COVID-19 pandemic. However, confinement brought back an ancient delight of humanity: stargazing. Astronomy Through the Window is an outreach project that is mindful of minorities and within everyone's reach. ATW includes online material with tips on how to watch the sky through one's window, curiosities about seasonal celestial phenomena and information on light pollution issue. All the material and LIVE stream activities aim at public interaction: to motivate people to use what they learnt and send us images of astronomical scenes captured through their window or backyard. We are receiving a great number of images and several positive feedback from all around Brazil. These images are published and used in social media of Observatório do Valongo. Through the use of astrophotography and online interactivity ATW promotes first interest in astronomy and science in general, as well as awareness about light pollution.

Resumo. Em 2020, nosso estilo de vida pós-moderno foi, em parte, contido com o auge da pandemia da COVID-19, que afetou toda a população mundial. Entretanto, o confinamento e a volta ao lar, trouxe novamente à humanidade um deleite ancestral: a contemplação do céu estrelado. O projeto Astronomia através da janela surgiu especificamente no contexto do período de quarentena, compelido pelo interesse maior da população sobre os fenômenos celestes. A proposta esteve atenta ainda para o caráter democrático da Astronomia que propõe, com o projeto, uma atividade que independe da condição social de cada um. Além da produção de material didático com dicas de como observar os astros através da janela, o projeto procurou discutir a problemática da poluição luminosa em diversos contextos e proporcionar um canal de interação direta com o público. Nele, o público é convidado a nos enviar imagens de cenas astronômicas capturadas da janela ou mesmo do quintal de casa, durante a pandemia. A proposta interativa ganhou adeptos em todo o Brasil. As imagens enviadas são utilizadas para finalidades de divulgação da Astronomia em nossos canais de comunicação. O sucesso do projeto é verificado pelo volume de colaboradores e pelo feedback positivo que recebemos do público. Conforme relatos, o projeto tem despertado o interesse sobre ciência e Astronomia, uma conscientização inicial sobre os riscos da poluição luminosa, a relevância das ações online de divulgação científica, uma curiosidade maior pela leitura e identificação do céu e o potencial do uso da Astrofotografia para finalidades de divulgação da Astronomia.

Keywords. Teaching of Astronomy – Light Pollution

1. Introduction

The starry sky has fascinated people since the ancient times. Before astronomy became a modern science, it was born out of humanity's enchantment with the cosmos and the need to understand how it works. During the 19th and 20th centuries, scientific development, partly driven by Astronomy, enabled humanity to use increasing technology in its daily activities. We migrated to cities, started to transform the environment, and live, almost always, hurried, in our post-industrial age.

In 2020, this postmodern lifestyle was, in part, contained by the peak of the COVID-19 pandemic, which affected the entire world population. It was necessary to withdraw for a moment and take safe measures. However, confinement and the return to home brought back an ancestral delight: stargazing.

2. Astronomy Through the Window

The project Astronomy through the Window (hereby ATW) emerged in the context of the COVID-19 pandemic, compelled by the population's interest in celestial phenomena and the need to keep alive the Astronomy outreach activities (Paula, J. A. 2013) of Observatório do Valongo (OV) of the Universidade Federal do Rio de Janeiro (UFRJ). The proposal encourages people to observe the night sky and proposes an activity that does not depend on the social condition of each one.

The project was conceived to act on two main fronts:

1. free access to outreach Astronomy material on our official website and social networks, without a specification of audience;
2. inspiring the public with feelings of wonder and awareness of the sky, leading them to interact effectively with the project team. As people become curious about a specific forthcoming astronomical event, many will want to try to obtain an astrophotograph themselves and send it to our team.

To accomplish the first objective, the project team worked on the production of astronomy material such as texts, images, videos and live broadcasts containing tips on how and what to

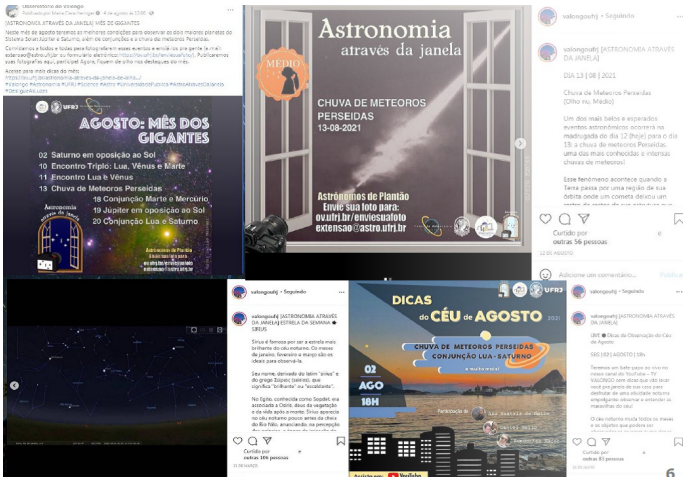

Figure 1. An example of the project's posts on social networks Facebook and Instagram (@ValongoUFRJ).

Figure 2. An overview of the astrophotography images sent by the contributors to ATW obtained with professional cameras, common cameras or even cell phones.

observe in the sky through the window, or even in the backyard. This material became part of the outreach publications on the Observatório do Valongo's official website and social networks, establishing and strengthening these communication channels with the public (Freire, P. 1983).

The monthly night sky observation tips and the Star of the Week both feature prominently in this material, which has been disseminated uninterruptedly since the project's creation in April 2020. Figure 1 shows an example of the project's posts on social networks. In July of the same year, the project started to carry out monthly live broadcasts in order to improve communication with the public.

The live broadcasts are available for access on TV Valongo Youtube channel, in the Astronomia Através da Janela playlist. The content is related to the monthly astronomy tips, and aim to enrich interactivity through astrophotography.

Our goal is also raise awareness to the light pollution problems in several contexts, establishing a link between Astronomy and other sciences. Through live broadcasts, social media posts and collaboration with other institutions, we promoted a discussion about social and environmental impacts, human health and observational astronomy concerns regarding light pollution.

To reinforce and build a solid interactive connection with audience, we created the mosaic of astronomical images sent by contributors in response to our activities. This display is composed of astronomical scenes images captured from the window or the backyard of the audience with professional cameras, common cameras or even cell phones. Astrophotography is very celebrated in modern times and has become very popular. The act of recording a starry night image can be seen as a challenge and places the participant in the scenario in which he actively seeks knowledge, learning, and improvement of specific skills. Bringing art and science together to help overcome a bad time is also a gateway to the discovery of the Universe through a particular view.

This interactive activity acquired supporters throughout Brazil and we started to receive astronomical images as soon as the project started. The received images are reviewed and used for the purpose of outreach Astronomy by our team, e.g. we put together an ilustrated Ephemerides Calendar with the received images - that can be downloaded for free at our website (https://www.ov.ufrj.br). Regardless of photographic quality and merit, all images are published and shared on our communication channels and social media, with accompanying information describing the astronomical phenomenon or object represented. Thus there is an important exchange of knowledge and an approximation between academia and society. As an example, Figure 2 shows an overview of the astrophotography images sent by the contributors to ATW. And all images received can be found at https://ov.ufrj.br/portfolio-types/janela/ .

3. Results and Conclusions

The project yielded, so far, more than 400 photographs submitted by more than two hundred participants from almost all Brazilian states, as can be seen in Figure 3. Never before our outreach activities had such a broad reach, outside Rio de Janeiro state. We even received some astrophotographs from other countries. In addition to the success that can be seen by the engagement, we received much positive feedback from public and increasing participation over the months. In April 2021, we celebrated the project's anniversary with a series of short videos featuring participants' collaborations with their astronomical images and feedback reports. The latter, in particular, are related to the social impact of the project, showing how activities have important repercussions on people's lives and how Astronomy, as a captivating science, can motivate important reflections on the human condition and our responsibility with the planet we inhabit. For the team, the reports are still impactful as they act as a special incentive for continuous improvement.

According to the reports of the participants, ATW has:

1. promoted interest in science and astronomy in people who until then had no knowledge of the subject;
2. allowed initial awareness of light pollution and its harmful effects;
3. revealed the relevance of online science dissemination actions during the pandemic;
4. encouraged greater curiosity for reading and identifying the sky in cultural and scientific contexts;
5. revealed and affirmed the potential of Astrophotography for purposes of teaching and disseminating Astronomy;
6. reinforced the importance of discussions about science, its methods, challenges and relevance for the new century.

Below can be seen some of the feedbacks received:

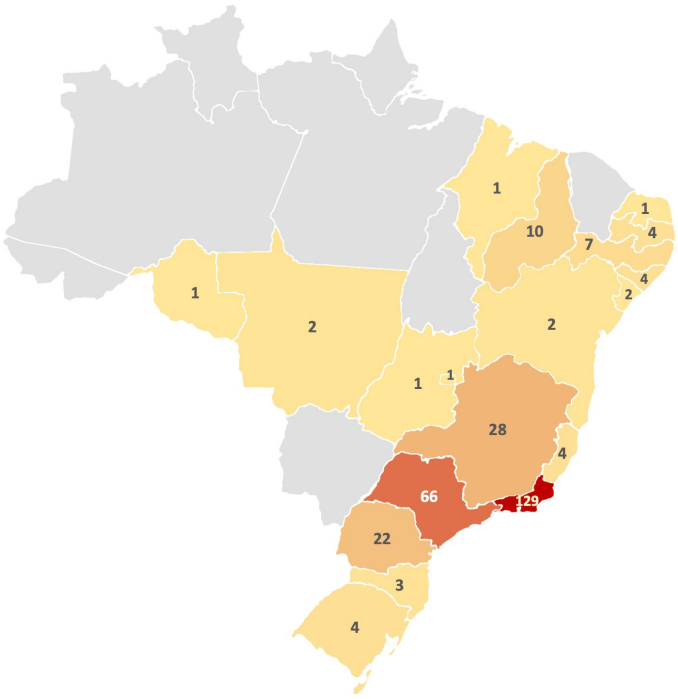

Figure 3. More than 300 photographs posted on social media from more than two hundred participants from almost all brazilian states.

> ATW makes me feel like I'm not alone when I spend hours looking at the sky! I feel there is a strong integration, exchange of ideas and feelings among those who happily share in this activity that seems so personal, but becomes collective when we meet each other. – **Rafaele Loureiro, Rio de Janeiro (RJ)**
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> Photographing the sky is placing us as part of this huge universe and it shows how small we are. Besides teaching people that the sky is a great showcase of the past, a calendar, a way to orient yourself in the space – fostering interest in how this entire celestial gear works. – **Victor Basile Astuto, Santos (SP)**
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> Participating in this interactive project was great. Before the pandemic we already were experiencing another 'pandemic'; because my father died and at the same time my mother became a wheelchair user with a stroke, almost 6 years ago. Then we haven't traveled much for a long time and avoided (and still avoid) leaving the house. As the 'window', which is the balcony that I take part of the photos, is part of my mother's bedroom, she tells me everything, when the moon is rising. The motivation has become mine and hers, which also affected my aunts, that rejoiced with the publication of the photos. – **Tania Oliveira, Olinda (PE)**
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> I love watching the night sky and its beauties, it awakens a feeling of peace and curiosity at the same time, of always wanting to discover something new, and be surprised. I love teaching what little I know to my children, to wake in them the same fascination I have for the universe, and so I take this opportunity to take them out of the virtual world. – **Luana Cristina Cunha, Uberlândia (MG)**

Owing to its interdisciplinar nature, ATW benefits from the cooperation of undergraduate students from several courses at UFRJ, as well as a body of independent collaborators, who have worked since the creation of the project (Jafelice, L. C. 2010). They act directly in the process of outreach activities, such as content production, live broadcast technical support and social networks posts. Furthermore, the project plays an important role in undergraduate student education, promoting new learning horizons and personal maturity. In early 2021, ATW became linked to the UFRJ Outreach Program – Letramento Científico - o Céu é o Limite, which encompasses Observatório do Valongo and Instituto de Física of UFRJ efforts to stimulate interest in science among young people and discuss the role of science in current times.

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