

How to spread optics in an interactive manner – LUZADA (USCOPTICA Student Chapter & Santiago YM Section): Our activities in 2023 & 2024

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Abstract. Spreading optics and photonics arises as a pivotal duty for researchers in the field, aiming to inspire new generations of students to pursue a scientific career. Furthermore, essential abilities for researchers such as explaining science to an audience or approaching abstract concepts in a visual manner can be easily learnt whilst performing science fostering activities. With these ideas in mind, USCOPTICA Student Chapter and Santiago USC YM Sections were born. Bachelor and Master students and early-stage researchers collaborate in our group, performing diverse outreach sessions, comprising hands-on scientific workshops in schools and science diffusion events, roundtables raising awareness on social issues in Academia and cycles of conferences in collaboration with other student groups. The following abstract aims to share with the scientific community our major activities in the last two years.

1 Introduction

Most of our activities are focused on the outreach, fostering and dissemination of physics and optics among the wide public. To fulfil these objectives, our group has actively participated in outreach events celebrated throughout Galicia, in Spain, collaborating with high schools and other institutions. Luzada is composed of Bachelor, Master, and PhD students. In addition to scientific dissemination, in recent years we have delved into social concerns related to Academia, with the aim of raising awareness in the university community. Finally, we have gained experience in the organization of scientific conferences, making the I and II Northwest Meeting of Young Researchers in Optics (I and II MYRO) a reality [1].

In our activities we attempt to approach optics and photonics from a multidisciplinary point of view, educating not only the public who take part in our workshops but also our members who could glimpse in an insightful manner how research works. In this contribution, we review the activities performed during 2023 and 2024 with the objective of sharing our outreach experience.

2. Our Activities

Provided the diversity of events carried out, three categories emerge: outreach, social concern in science and professional development of young researchers.

2.1. Outreach activities

Since the birth of our organization, we have been trying to approach science in an engaging and amusing manner, with the purpose of inspiring future students as well as broadening minds among the general public.

On the one hand, our members perform interactive workshops in high schools. Our outreach experiences try to explain optical phenomena and relate them to the daily life of the students. We spread up to 5 hands-on experiments around the classrooms, some of which are depicted in Fig. 1. Students are divided in groups moving around each experiment. The main topics explained throughout the interactive tour comprise the concepts of refraction and Snell's law related to optical communications, the idea of polarization and its application to material stress detection, the phenomena of fluorescence, phosphorescence, diffraction, and interference, and, finally, the functioning of the human eye and their main diseases.

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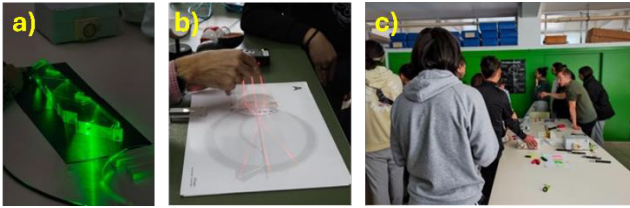


Figure 1. Some experiments performed in high schools: a) optical communications, b) the human eye, c) fluorescence.

In addition to outreach in schools, we join in science diffusion events in collaboration with our university and other institutions, as seen in Fig.2. There, physics experiments are approached to all publics, adapting the complexity of the ideas according to their age.



Figure 2. Outreach in our community. a) Science Street Day, b) Science of minerals and c) Physics for Teachers

2.2 Social concerns in the scientific realm

The scientific community must be aware of the problems and concerns of society, participate in their improvement, and integrate their advances. According to this principle, our chapter is committed to carrying out workshops focused on various aspects of equality within the framework of STEM (Science, Technology, Engineering, and Mathematics).



Figure 3 Social Issues Events. A) Gender Bias in Education, b) LGBTQ+ in STEM and c) interactive activity

With these objectives in mind, three interactive workshops were performed: two of them related to the issue of gender inequality in Academia and gender-bias in Education. Several researchers and experts in those fields were invited to a roundtable to expose their point of view whilst sharing their personal experience. On the other hand, we held the LGBTQ+ in STEM Workshop, with the key participation of some experts as well.

2.3 Novice researcher and student formation

Carried out by the Student Chapters from Santiago de Compostela (USCOPTICA) and Salamanca (OSAL), the II MYRO emerged as a self-organised cycle of conferences aiming to approach research in an insightful

way to Bachelor and Master students. This 3-day event offered a variety of scientific activities and outreach.

On the one hand, MYRO II offered experiences related to research, including senior lectures, PhD researchers talks, visit to cutting-edge laser facilities, roundtables informing about the strong connections between photonics and industry, as well as workshops on social inclusion issues in Academia. On the other hand, outreach experiences were carried out, including an open-air event where the general public could enjoy different interactive experiments related to light phenomena, such as holography or waveguiding.



Figure 4. Scientific and outreach activities at MYRO II a) Scientific talks b) CLPU visit c) open-air outreach activities.

3 Conclusion

During 2023 and 2024 we were able to perform a wide range of activities not only to approach students to research but also to arouse the curiosity of high school students and the public to enjoy science. In the future we would like to expand our horizons and propose new outreach events, including a workshop of planet and star observation with telescopes and a workshop aiming to approach optics to blind people in collaboration with local associations.

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References

1. Carnero, B. et al. (2022): “Celebrating a face-to-face congress of young researchers in Optics after the pandemic years: the I NW MYRO”, *EPJ Web of Conferences*, Vol. 266.