

Participant Perspectives on the ESO Astronomy Camp Programme

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This article describes the experience of attending the European Southern Observatory (ESO) Astronomy Camp from the perspective of its participants — students aged between 16 and 18 years old from around the world. The students shared a week together during the winter of 2014 in the Alpine village of Saint-Barthélemy, Italy. The camp was organised by ESO in collaboration with Sterrenlab and the Astronomical Observatory of the Autonomous Region of the Aosta Valley and offered a rich programme of astronomy and leisure activities. This article focuses on the concept of astronomy camps, and their role as a unique tool to complement formal classroom education, rather than on the astronomy activities and the scientific programme. Thus, it is not an academic review of the implemented methodologies, but rather a reflection on the overall experience. The article was brought together from collaborative accounts by some of the participants who were asked to reflect on the experience. The participants who contributed to this article represent the diversity of the ESO Astronomy Camp's alumni community.

The outdoor learning environment

There are many learning experiences that cannot be achieved through standard school courses. Attending the ESO Astronomy Camp 2014, was for the participants, a unique opportunity that complemented formal teaching. Some of the most stimulating parts of the camp were the opportunity to travel abroad, stay in an unknown environment, and explore and establish new relationships. The camp was located in a remote Italian Alpine village with very little ambient light at night — every astronomer's dream — and a fairly dry climate, which reduces atmospheric turbulence. This environment made both the sessions and free time incredibly enjoyable and productive. Of the 56 young adults who attended the camp all were overwhelmed by the amazing views of the constellations at night — with everyone taking out their cameras to capture the stars.

The camp allowed the students to meet a number of individuals who have dedicated their lives to astronomical achievement and research, and gave them the opportunity to use high technology instruments for learning. In addition, the camp helped with the interpersonal and social skills that are needed to develop a cohesive group, and promoted the teamwork that comes from working with new friends, who were strangers at the beginning of the camp.

Exposure to scientific facilities

In school, students do not get a chance to use research instruments. The ESO Astronomy Camp 2014 provided an opportunity for students to gain real insight into the nature of research and a hands-on experience of how it is carried out. Using telescopes for observations of celestial

bodies provided an excellent introduction to astronomical observation.

The programme included the chance to choose a star and record its spectrum, and to capture images of star clusters to measure the distances to them. These observations let the students apply the theoretical explanations learnt in the classroom to data that they have collected themselves.

The instruments were only one part of the research facility; the scientists themselves were a fundamental part of the learning process. The combination of access to facilities and to researchers is something that cannot be experienced in a formal teaching environment, but for the motivated and interested students who have had a chance to participate in this kind of initiative, the experience provided important insights into the world of

research. The experience taught the students that they can interact with the scientific world, and be part of it, no matter what career they ultimately choose.

A cup of tea with an astronomer

All the camp participants attended informal talks with the astronomers around dining tables during lunch and at teatime. These talks demystified the scientists and showed that they are real people leading normal lives. The image of an astronomer, who is often seen as someone who may be hard to relate to, who uses many big words while talking, who spends nights watching the sky or staring at a computer monitor, or even as someone who always looks out into infinity, was dispelled. Astronomers are not a sort of alien nor are they special people doing work that no ordinary person can aspire to do, they do not have to live alone, hiding from society and enclosed inside a private world, instead they are quite normal in terms of their lifestyle and work. This shows that becoming an astronomer does not mean changing, but rather cultivating, a passion for learning about the Universe and that it is a job that all the camp attendees could aspire to.

These valuable talks with astronomers were quite different from the kind that a student normally has with teachers at school, where students sit at their desks, listen to the professor and take notes. In this setting, the initial tension caused by the presence of individuals who might be considered impressive and different

subsided due to the friendly and intimate environment.

Students learned that the astronomers' strength and love for the Universe were the drivers that allowed them to achieve their goals. For example, several astronomers had made countless changes of place and undertaken various programmes of study to obtain the position they were aiming for, in this case, working and studying in Chile. It was very enriching to understand how it is possible to reconcile a private life with such demanding work and this was an issue that many of the participants considered important. It is difficult to understand how to make compromises or sacrifices regarding personal relationships for a career, even a successful one, and many students do not have the opportunity to see or discuss this so early in life.

Relevance to the school curriculum

Most of the students did not see the astronomy camp as an extracurricular activity, but as a way to master or put into context scientific concepts learned at school, mainly those from physics. The camp workshop on the measurement of distances introduced concepts such as Kepler's laws and logarithms from mathematics that are part of the formal school programme. The younger participants were introduced to these concepts for the first time, while for others it was a review. In both cases, however, the topics were introduced in a clear and concise way and, most importantly, applied through exercises that were worked

through alone or in groups — first during lectures, then developed on their own.

Once the students returned to school some of the schools found ways to broaden the experience, giving other students a taste of what was learned. Teachers asked participants to give presentations about the camp to fellow students. This allowed other students to benefit from the experience of a single participant. Some students were financially sponsored by their school, thanks to the support of teachers and headteachers who considered the camp to be an invaluable way for students to see how the concepts they learn at school are applied in a real scientific environment.

A growing community of alumni and researchers

An important aspect of the ESO Astronomy Camp is the opportunity to meet like-minded students from all over the world. Even though all the participants on the 2014 trip had experienced a family or school trip abroad, only an intensive experience like this camp could give them the chance to meet students from other countries and gain an international perspective. From the moment the participants met at the airport, they started to talk, forming bonds based on common interests and attitudes. By the time the group arrived at the hostel, long-lasting friendships had already been established. It is for this reason that the leisure activities are an integral part of the ESO Astronomy Camp programme.



Figure 1. Group picture from the ESO Astronomy Camp 2014. Credit: P. Calcidese–Fondazione C. Fillietroz, ONLUS/ESO

The organisers believe the group experience improves self-confidence and reinforces the feeling that the talented students, who sometimes have struggled to find friends with the same interests at home, are actually part of a larger community. The ESO Camp is a closed group on Facebook, and is a hub where students continue to share practical information and interact with participants from previous years, the organisers and astronomers about anything related to science and astronomy. In the future, it is hoped that the group will become an important tool for mentoring and sharing opportunities among all participants, including senior astronomers and ESO staff.

At the end of the camp, after such an intense week together, everyone was quite emotional. At the same time, there was the general feeling that most of the members who are now part of this small but vibrant community would meet again for holidays or for their studies, fostering a true European spirit.

What long-term effects can be expected from attending the camp?

Attending an ESO Astronomy Camp gives the participants a big motivational boost that inspires a continuing interest in astronomical research and observation and influences the choices they make in their lives. All of the participants who came to the 2014 camp, came with a great deal of curiosity and a passion for astronomy — and they left with even more.

Many of the students plan to pursue university studies connected to astronomy after finishing secondary school. The ESO Astronomy Camp deepened their interests in discovering more about the Universe in ways that regular science lessons will never be able to. The camp gave students insights into many fields within astronomy and let them catch a glimpse of what professional research is like. This unique opportunity will surely help those who want to follow a career in professional astronomy, and it will also ensure that those who take different career paths remain passionate hobby astronomers.

Several students asked for a certificate of participation, which they wish to use in a university application, as participation in the camp is proof of their motivation, interest, scientific knowledge, ability to work in a team and English-language proficiency. The camp was also an excellent place for networking with potential future colleagues in research, as well as with current experts in astronomical research from ESO and various other institutions. These connections are extremely helpful in terms of receiving advice and mentoring.

Another major advantage that the camp brought to the students is internationalisation, in both the scientific and non-scientific sense. In today's global village it is essential for future professionals to be aware of and understand other cultures and ways of life. This is especially important for astronomers-to-be, since astronomical research is mostly carried out at venues of international cooperation. For these students, the ESO Astronomy Camp was the first step in this direction.

Conclusions

The main aim of the ESO Astronomy Camp is to bring together astronomers and students from different countries to learn, work and discuss in an open and informal way. The organisers believe this approach is a powerful means of letting students make connections between what they learn in school and the world of research; it allows students to increase their science and astronomy literacy and provides a unique opportunity to interact with working professionals at a research centre.

The ESO Astronomy Camp follows the European guidelines for promoting excellent and socially desirable science and technology. Besides being exposed to the academic content, the students had the chance to engage in discussions with astronomers on the role of astronomy in our society. This gave them new perspectives on how they can apply their skills to new domains. The researchers, in turn, interacted with this younger generation, and learned about their needs, issues and expectations.

The ESO Astronomy Camp brought together a mix of motivated and talented people who have a shared vision and interest and who enjoyed spending time together to enhance their learning. Overall, in this Alpine environment, this group of talented like-minded individuals and experienced astronomers provided an opportunity for students to make the most of the out-of-school learning experience.



Figure 2. Image of observing activity taken by participating student. Credit: Tomasz Świerczewski

Biographies

Davide Cenadelli graduated in physics and received a PhD from Milan University. His interests span stellar astrophysics, spectroscopy, and the history and philosophy of science. He is currently part of a research group at the Observatory of the Autonomous Region Aosta Valley involved in the quest for exoplanets around red dwarfs in the galactic neighbourhood.

Cristina Olivetto graduated in physics at the University of Milan and was awarded a PhD in the history of physics. After graduation, she started to work in the field of science communication and education with several national and international organisations. She founded Sterrenlab in 2011.