

ATLAS Public Engagement: The CERN Open Days Experience

Ana Peixoto^{a,*}, on behalf of the ATLAS Collaboration

*^aLaboratório de Instrumentação e Física Experimental de Partículas,
Departamento de Física, Universidade do Minho, 4710-057 Braga, Portugal*

E-mail: ana.peixoto@cern.ch

The ATLAS experiment at the Large Hadron Collider is collecting unprecedented amounts of proton–proton collision data. The ATLAS Collaboration analyses these data, seeking to give answers to questions that have puzzled particle physicists for many decades now. In this process, the Standard Model is being precisely measured and searches for new physics are performed in sophisticated and clever data analyses. When ATLAS physicists explain to non-experts what they are doing and why, they use their passion to come up with equally clever means to achieve that. The aim is both to motivate the younger generations as potential future scientists, and to reach out to the general public, creating an audience more interested in future achievements and convincing them of the importance of their pursuits. While there are many opportunities for interacting with the public, events like the CERN Open Days in 2019, with about 70000 visitors, carry a special weight in terms of potential impact. This proceeding highlights activities the ATLAS Collaboration used to connect with the visitors during the 2019 CERN Open Days. It discusses the experience of the event preparation and concludes with impressions of the impact of the proposed activities on the interactions with the amazing visitors, which made the 2019 CERN Open Days weekend a memorable event.

*The Eighth Annual Conference on Large Hadron Collider Physics-LHCP2020
25-30 May, 2020
online*

*Speaker

1. Introduction

The 2019 CERN Open Days event took place on September 14–15 where more than 70000 visitors from all over the world learned about the field of particle physics through several outreach activities. The ATLAS experiment [1] was one of the highlights of the event, providing a wide range of activities for all ages. Some examples of these activities are highlighted in Figure 1. Each ATLAS activity is described in detail in the following three sections: activity stalls, detector exhibition and underground detector visits. Statistics and some feedback can be found in the conclusion section.



Figure 1: Photos of some activities held by the ATLAS Collaboration: proton cookies (top left), detector exhibition (top right) and underground visits (bottom) [3, 4].

2. Activity stalls

Distributed around the CERN Globe of Science and Innovation as well as on the Meryin site, several experiences with different goals were prepared for all visitors:

- **Proton Cookies:** Visitors decorated cookies (protons) with candy (quarks) using sugar glazing (gluons) while learning about protons;
- **Science Café:** ATLAS physicists were baristas for a day and answered visitor questions about the Universe and particle physics while serving coffee and cookies;
- **Higgs Corner:** ATLAS physicists explained through interactive games the challenges of studying this very special particle discovered at the LHC;

- **Computing & Software Corner:** Billions of particle collisions recorded by ATLAS require an exceptional expertise in software and computing. Visitors learned about the extraordinary computing challenges of analysing LHC data and about how they can help as citizen scientists;
- **Build Your Own Particle Detector:** Design, construct and name your own particle detector using Lego bricks - fun for visitors of all ages;
- **Making a Splash:** Conservation of energy in particle collisions was demonstrated by collisions of water balloons that really splashed;
- **Colliderscope:** An audio installation using real waveforms displayed on an oscilloscope (re)creating the different sub-detectors. The sounds were designed to draw images of the full detector [2];
- **Selfie Wall:** Taking a photo in front of the ATLAS detector posing as a scientist with the safety helmet on was possible with the official camera (having the photo printed in the moment);
- **Puzzles:** Challenged to build an ATLAS detector replica, the visitors were invited to assemble the whole ATLAS detector. While putting together the pieces, the visitors were invited to correctly correspond the name and the design of all sub-detectors, enabling the curiosity about their characteristics and objectives.

3. Detector exhibition

A detector exhibition was assembled where the visitors were able to look at prototype, current and future detector parts. Amongst them, the new ten-metre-tall New Small Wheel detectors, part of a major upgrade of the ATLAS experiment, was probably the highlight. As this visit point was located 2 km from the ATLAS detector, ATLAS spontaneously began organising guided walking tours through the CERN Meyrin campus to the workshop. These proved a resounding success, with a total of 15 walking tours organised.

From the inner detector to the outermost component of the ATLAS detector, the different detection techniques used in the experiment were explained in detail profiting from a hands-on experience with real pieces of each sub-detector.

4. Underground detector visits

Around 3800 visitors, a new record visit count for ATLAS and 1300 more visitors than in 2013, were guided by an ATLAS member for a unique opportunity to see the ATLAS detector as well as experimental infrastructure and LHC access tunnel. The challenge of welcoming 1900 visitors per day (400 more than expected) was met by diligent planning with 14 people accompanied by 2 guides descending to the cavern every few minutes and real-time coordination by several crowd marshals at strategic points. Additionally, more than 1500 visitors visited the ATLAS control room while learning about how the ATLAS detector is operated when recording data and how the physics analyses are performed.

5. Conclusions

The 2019 CERN Open Days were a major challenge and a great success as illustrated by the statistics in Table 1 and some examples of the feedback received:

- “Visiting CERN is something I have wanted to experience for at least 20 years. To get to see things like the ATLAS muon spectrometer and calorimeter down in the cavern was so exciting (to that extent that my hands were a bit shaky).”
- “I was particularly impressed by the three high-school students in our ATLAS visit group, who had saved money all summer and travelled from Belgrade to attend the Open Days. Their future is bright, and I am sure they will work at CERN one day.”

Table 1: Summary of statistics of all the ATLAS activities during the 2019 CERN Open Days.

ATLAS Open Days in numbers	
279 ATLAS volunteers	~ 3000 science café cookies eaten
~ 1800 proton cookies served	~ 15 ATLAS walking tours from P1 to B191
~ 3800 visitors underground	~ 1150 photos printed at the photo wall
~ 1500 visitors to the AVC	~ 2900 ATLAS cups given out
~ 267 registered LEGO models	~ 2000 coffees served (with ~ 1000 sugar bags)

The dedication of about 290 volunteers and their passion to share knowledge were the key ingredients for the popularity and success of the ATLAS itineraries during the 2019 CERN Open Days. Crowd marshals, guides, activity coordinators, site supervisors - everyone was well prepared for their tasks, welcoming visitors to ATLAS and adapting to the continuously evolving environment. The record number of underground visitors was the major highlight that required a careful, safe implementation of the visitors programme, with many precisely choreographed steps. The planning and testing of this programme well in advance along with the experience of the organizers allowed a great success of the ATLAS activities as attested by the numbers and the feedback received from the visitors.

Acknowledgements

The author was funded by Fundação para a Ciência e Tecnologia (FCT) through the Portuguese ATLAS project CERN/FIS-PAR/0002/2019, FCT grant SFRH/BD/129321/2017 and ATLAS PhD Grant 2018.

References

- [1] ATLAS Collaboration, JINST 3 (2008) S08003
- [2] Colliderscope, <http://cern.ch/colliderscope>

[3] CDS record: 2019 CERN Open Days - ATLAS Visit Points and Activities, <https://cds.cern.ch/record/2689842>

[4] CDS record: 2019 CERN Open Days - ME-72, <https://cds.cern.ch/record/2691582>

POS(LHC2020)229