

## The science communication: The outreach activity of the ATLAS Collaboration<sup>(\*)</sup>

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**Summary.** — The ATLAS experiment, located at the LHC, CERN, has put in place since several years outreach projects, in order to communicate science and scientific results to a general public. The outreach activity has the fundamental role of inspiration for the future generations and of reinforcing people's trust in the fundamental research. The digital communication has become of common usage: the social media and virtual reality are the way people keep the contact with the outside world. It is important then to include science in the digital communication. In this contest, the ATLAS collaboration is present, with its social media activities, YouTube and the Virtual Visits, which let people have a look inside the cavern of the experiment. In this document, an overview of all these activities will be presented, which resulted really important in strengthening the contact with the world outside during the COVID-19 pandemic.

### 1. – Introduction

The ATLAS Collaboration at CERN [1] is involved in several outreach projects and activities, occupying an important role in the science communication among the other LHC experiments. The collaboration has always been aware of the impact of a proper communication on the future generations and on the general public, which can be sceptic about fundamental science.

People are used to communicate and learn through virtual channels, in particular social media. In this contest, ATLAS finds its own space within the digital communication, opening accounts on the most popular platforms. ATLAS is in fact for example on Facebook, Instagram, TikTok and YouTube, sharing entertaining and informative contents, accessible to the general public. Among the digital communications there are also the Virtual Visits, conducted by an ATLAS researcher inside the cavern or in the ATLAS Visitor Center, connecting people around the world.

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The traditional communication, which includes the direct human interaction, is still fundamental in science communication. ATLAS is always active in this area with Masterclasses, conferences, merchandise, participation in the European Researchers' Night and much more.

## 2. – Digital Communication

In the last few years, several digital instruments came up which allow a fast and effective communication with the public. In this section, all the used communication channels are presented: the ATLAS Web Site, the Social Media and the Virtual Visits.

**2.1. *Web Site.*** – The ATLAS web site [2] is open access, intended to be used by both ATLAS members and general users.

On the web site, the latest news about the physics results and all the information about the ATLAS detector can be found, written in an informative and accurate way. In addition to the physics content, also the ATLAS collaboration is presented, with an explanation about the organizational structure and, in case someone is interested to join ATLAS, the possible career opportunities.

Cheat and fact sheets are available on the web site for educational purposes, where there are short lessons about particle and detector physics. Colouring books and activity sheets are also present on the web site for children usage.

**2.2. *Social Media.*** – In the last years, social media became fundamental in sharing scientific contents with a large audience. The ATLAS Collaboration is involved in the social media activity with its own account on the most famous platforms. It regularly publishes on the dedicated channels: Instagram [3], Facebook [4], Twitter/X [5], TikTok [6], Flickr [9], YouTube [7] and LinkedIn [9]. On the social media, ATLAS shares news and information about the experiment in order to catch in the interest of the people, using the young generation language. The message is spread through videos made by scientists and researchers, specifically on Facebook, Instagram, TikTok and YouTube, with video streaming and interviews.

The Italian ATLAS community is also involved in the social media activity. In particular, with Facebook [10], Instagram [11] and Twitter/X [12] accounts, it aims to communicate and inform people about ATLAS experiment in the Italian language.

**2.3. *Virtual Visits.*** – The ATLAS Virtual Visits system [13] was born in 2010, in order to give the opportunity to groups from all over the world to explore CERN and the experiment through a live video link. There are two different virtual visits: the group virtual visits, opened to schools or university groups, and the open virtual visits, addressed to a general public, even online on YouTube or TikTok. The visit is managed by scientists working in the experiment. During the visit, guides introduce themselves and explain their contribution in the experiment. In the last part of the visit, students and interested people can ask the guides for curiosities.

A group Virtual Visit can be booked on the ATLAS experiment web site [2], expressing their preferences for time and languages. The video conferences are provided by ZOOM or Skype. The main location of the visits is the new ATLAS Visitor Center [14], next to the ATLAS Control Room. In the new Visitor Center, among other updates, there is a new dedicated area, with improved equipment, connectivity and lighting for visit hosts and allows to have virtual and in-person visits at the same time.



Fig. 1. – (Left) Sue Cheatham and Steven Goldfarb host an ATLAS Virtual Visit from Holy Comforter Episcopal School, Tallahassee, Florida, USA. (Right) The new ATLAS Visitor Center [13].

When the LHC is not operative and the cavern is open, guides can go inside the ATLAS cavern and show the audience the experiment from a closer standpoint.

### 3. – Traditional Communication

The traditional communication consists in those outreach activities involving the human interaction. The digital communication is in fact direct and effective, but it is not enough for reaching all the people. For this reason, ATLAS is involved in several outreach activities for the general public, schools and universities. Among all the projects, the experiment is active in Masterclasses, conferences, merchandise, interdisciplinary projects, the European Researchers' Night or similar events.

In order to communicate with an high-school audience, ATLAS participates to the International Masterclass [15]. Between the end of the winter and the beginning of the spring seasons, high school students of 60 world countries go to the nearer universities or research centers for one day of lectures and activities regarding particle and nuclear physics. At the end of the day, the participants experience a conference for discussion and combination of their results, like in an international research collaboration.

The European Researchers' Night (ERN) [16] is an Europe-wide public event powered by the Marie Skłodowska-Curie Actions. In 2023, ERN event took place in 26 countries on Friday 29 September. The aim of the event is to bring the research and researchers closer to the public, promote the European projects and increase the interest of the young people in science. Every year, ATLAS researchers join the ERN event, sharing how is a researcher-like day, involving the public in fun activities and experiments.

ATLAS takes part also in interdisciplinary projects, like Art & Science across Italy [17], which is an European project organised by the National Institute for Nuclear Physics and CERN. The purpose of the project is to bring students closer to the world of science and research, using art as the communication language.

### 4. – Conclusions

In conclusion, the ATLAS Collaboration has an active role in the outreach activities, using several communication media.

The digital communication is the fastest media and is able to reach a wider public, in particular the youngest generations. The ATLAS digital program consists in an open access web site, where people can be informed about the latest news and find details about the experiment; in the involvement in the social media, with accounts on the most famous platforms; the Virtual Visits, allowing people around the world to be guided inside the experiment, without being in presence at CERN.

The ATLAS Collaboration considers also fundamental the traditional communication. The experiment is involved in Masterclasses, conferences, merchandise, interdisciplinary projects and the European Researchers' Night, in order to be deeply involved to the general public, schools and universities.

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