PROCEEDINGS OF SCIENCE

Humanising Science through CMS Outreach Initiatives

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In the increasingly fragmented media landscape where there is an overload of information reaching any member of the public, it is a human connection that cuts through. To maintain public support for the Large Hadron Collider (LHC) experiments and keep audiences invested in the continuous process of science, the research must be humanised. The Compact Muon Solenoid (CMS) Experiment has strategically initiated a series of new outreach activities, primarily focused on social media, by platforming a diverse set of people and sharing the scientific journey. This approach makes particle physics more accessible and relatable to the public, regardless of their scientific background.

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Speaker

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1. Introduction

Public support for large-scale, international scientific collaborations, such as the LHC experiments, is fundamentally dependent on public understanding and engagement. The prevailing stereotype depicts the physicist as an exceptionally competent and socially isolated genius, a detachment that often feeds directly into the cultural archetype of the "mad scientist". This intimidating and unrelatable persona serves to distance the public from the reality and diversity of the modern scientific community.

While some scientific disciplines, such as cancer research, are inherently valued for their direct and obvious application to daily life, fundamental research must often actively demonstrate its long-term importance and justify its essential role in understanding the Universe[1]. The objective of the CMS outreach strategy is to shift this limiting narrative to ensure the sustained support of funding agencies and governments, and, critically to inspire and recruit the next generation of researchers.

The core conclusion guiding the CMS outreach redirection is that science becomes relatable when the audience feels a personal connection to the scientists and their work, and recognises that the research performed at CERN is relevant to their lives. Furthermore, this approach emphasises that true public understanding requires focusing not only on breakthrough results, but also on the methodologies and collaborative spirit that define the scientific process itself. This paper gives an overview of the communication strategies implemented by the CMS Experiment to achieve this humanisation.

2. Original CMS social media strategy

The CMS Experiment's original social media strategy primarily positioned its accounts as a promotional platform to distribute content housed on the official CMS website (cms.cern), such as detector and collaboration news articles, and analysis results. Messaging was weighted towards celebrating monumental past discoveries, such as the Higgs boson, and future potential. This singular focus on outcomes was inconsistent with the core principles of the scientific method, obscuring the value of the process itself and less newsworthy, but no less essential, findings and measurements.

The content strategy was unified across most channels except Instagram, due to the inability to embed hyperlinks in captions. The Instagram account, launched in 2018, adopted a distinct visual approach that centred on the impressive hardware of the experiment rather than the complex results. Content relied heavily on current or historical photography of the CMS detector and its sub-detectors. The strategy included a strict, deliberate decision to omit the human element: despite posting large collaboration group photographs several times per year, there was a consistent mandate to avoid highlighting individuals by refraining from mentioning their names or institutional affiliations. This approach culminated in a visual narrative where the detector was positioned as the main star, completely overshadowing the diverse community of scientists responsible for its construction, operation, performance and upgrades.

3. Strategic principles of human-centric communication for CMS

The revised CMS communication strategy for social media [1] is founded upon three key principles designed to establish trust and genuine engagement with non-expert audiences:

[1] Of course, fundamental HEP research has directly affected medical diagnosis (advanced detectors) and treatment (particle beam therapy).

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- Prioritising representation: The audience must be able to see themselves reflected in the people communicating the science. A diverse range of backgrounds, expertise, roles, genders, and nationalities creates a sense of belonging and relevance.
- Cultivating authenticity: Trust is built by demonstrating the genuine, unvarnished process of scientific life, rather than presenting a polished, curated institutional image.
- Focusing on people, not papers: Scientific results, formalised within research papers, present a significant barrier to public understanding because the language used is necessarily complex, and keeping up with the volume of publications is time-consuming for non-scientists. Therefore, making science demands the translation of the papers' content into simplified short news articles and explanatory videos, and the prioritisation of human-focused stories about the researchers.

3.1. Prioritising representation

Relatability is directly linked to the principle of representation. For example, to encourage young women to become more interested in the science of CMS and possibly pursue careers in STEM, students from countries of every continent, and individuals from underrepresented backgrounds must see role models who share their identity [2]. CMS addresses this through dedicated content aimed at creating an inclusive environment.

In 2023, CMS launched for the first time a series of multilingual videos for the Women in STEM Day (February 11th) [3]. The concept of these videos is that each video features women who speak in their mother tongue about what inspired them to be a scientist, and they give some advice for young girls who want to follow a similar path. Each year the CMS experiment enriches the series with additional women from different countries. As of 2025, this series consists of 33 videos and it is an ongoing project, meaning that the goal is for every young girl that maybe doesn't speak English, to be able to find a video of a woman scientist of her country to relate to. On every International Women and Girls in Science Day, there is a peak in female viewership of the CMS YouTube channel, and these videos attract audiences from countries that normally are not in the top 5 for this channel. The success behind this project lies in the fact that research shows that younger generations need role models to make them feel seen and represented, and this project included very different women, of different disciplines and ages, providing new role models.

Similarly, CMS Communications is collaborating with the CMS Diversity and Inclusion Office for the LGBTQIA+ STEM Day (November 18th) to publish photos and/or videos on social media with supportive messages toward the scientists who are part of this community, and also showcasing example role models.

Of course, the aim is much more than directly providing relatable role models to specific communities: to show all people, whether inside or outside of these communities, the critical value of diversity and inclusion.

3.2. Embracing authenticity and transparency

Content focused on individual experiences consistently proves to be the most successful in terms of audience engagement. High-performing content includes personal Q&A sessions with summer students and award winners. These interviews share practical experience and advice, making the collaboration more accessible to aspiring researchers at the beginning of their careers.

CMS also maintains a dedicated blog platform [4] where any CMS member is encouraged to contribute posts on their personal experiences within the experiment. These blogs feature a

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diverse range of subjects, including ‘what it is like to be a CMS shifter in the control room’, to ‘how it feels to be working in a clean room in Italy’ or ‘how PhD students destress from work’. This platform empowers a broad range of voices to share their unique perspectives.

To show authenticity, CMS has incorporated communication methods that prioritise unscripted content, such as live streams and ‘behind-the-scenes’ reporting. In the past years, CMS has organised live streams on YouTube and Instagram, which were intentionally informal, involving scientists answering public questions spontaneously without a strict script. This “raw” format conveys a sense of direct access to the CMS scientists. Instagram also allows the posting of photos or videos that disappear after twenty-four hours, which is ideal for providing a behind-the-scenes look at major physics conferences, and this content is fast and easy for any scientist to produce as it needs little or no editing.

3.3. Communicating more than results

A significant aspect of humanising science involves acknowledging that the path to scientific results is non-linear. By deliberately moving away from an exclusive focus on final results, CMS educates the public that mistakes and setbacks are normal parts of the scientific process. Examples of this transparent communication include highlighting the duration and the commitment required for a precision measurement, and sharing incidents that have occurred in the detector to build a more realistic and trusting relationship with the audience. Furthermore, by sharing success stories that details how these incidents were quickly and effectively resolved, we can proactively address concerns and counter misinformation suggesting that scientists lack the capability to manage significant detector or LHC malfunctions.

4. Social media trends and collaboration with content creators – outside and inside the CMS Collaboration

It was important to adapt a more modern strategy and move away from the serious, formal tone of voice that institutes usually adopt, in order to attract younger people who have grown up in this media landscape. CMS actively pursues direct engagement on social media platforms by responding to comments, incorporating humour where appropriate, and creating polls and quizzes. This social approach creates a dynamic interaction with the audience. Recreating popular internet trends and using relevant references from pop culture, such as a photo of a Barbie ™ doll inside the CMS cavern posted upon the movie’s release, generate significant engagement and comments (especially as the doll was deliberately not wearing a safety helmet!). Furthermore, CMS started posting humorous content on platforms with younger audiences, such as Instagram and TikTok, and using popular music as background sound on the videos.

CMS started accepting collaborations with content creators, which increased the experiment’s popularity with younger audiences in particular. These creators have already established a strong, personal connection and trust with their communities, making their endorsement highly effective, while also reaching (sometimes) non-English speaking audiences. The strategy of collaborating with external content creators is based on allowing our visitors to tell the CMS story, rather than CMS doing so directly. These creators understand what their subscribers want to see, and can therefore tailor their storytelling to their audience’s needs. Initial results indicate that these videos are significantly more successful than those published directly on the official CMS YouTube channel, and CMS is actively pursuing further collaborations of this type.

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Equally important are collaborations with scientists within CERN who maintain their own successful science communication channels. These researchers produce content in their personal style, which is often more authentic and engaging than institutional content. While institutional accounts are essential, individual-led communication thrives because people connect with personalities. This presents a continuous challenge for a collaboration of more than six thousand members: how to maintain a personal connection without constantly featuring a small, rotating cast of people.

5. Concluding remarks

While CMS Communications continues to seek the most effective strategies for broad engagement, CMS remains faithful to its commitment to showcasing as many of its members as possible. CMS will continue to highlight the collaboration's vast diversity, providing recognition to our dedicated scientists, technicians, administrative staff and students.

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