

## Continuing professional development in the largest scientific laboratory in the world: perspectives and needs for a science communicator @ CERN

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**Abstract**

A short outline of the evolution of communications at CERN since 1993 and the parallel growth of the need both for professional communications and, at the same time, the need for training in more and more complex competencies for the new profession.

**Keywords**

History of public communication of science; Popularization of science and technology; Professionalism, professional development and training in science communication

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I work at CERN,<sup>1</sup> the European laboratory for particle physics, based in Geneva, Switzerland and used as their scientific home by almost 15 000 experimental physicists from all over the planet. My story at CERN, in terms of training and professional growth, is a perfect illustration of the rationale which was included in the proposal of this commentary:

*“Even where postgraduate courses are available, they are unlikely to meet the needs of all professionals working in science communication especially because formats, approaches and procedures are changing fast to better meet the needs of society.”*

A linguist and simultaneous interpreter by training, I arrived at CERN in 1990, recruited to be the personal assistant to the Director General at the time (Carlo Rubbia). After the first very intense and enriching four years in this position, I was appointed leader for the Visits, Exhibitions and Outreach section within the newly created Communications group by the new Director General, Chris Llewellyn Smith, who was facing the challenge of raising funds and consent for CERN’s future accelerator project, the LHC (Large Hadron Collider), at a time when the

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<sup>1</sup>CERN, the European Organization for Nuclear Research, is the world’s leading laboratory for particle physics. Its headquarters are in Geneva. Its Member States are: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Israel, Italy, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom. Romania is a Candidate for Accession. Cyprus and Serbia are Associate Member States in the pre-stage to Membership. Pakistan and Turkey are Associate Member States. European Union, India, Japan, JINR, Russian Federation, UNESCO and United States of America have Observer status.

United States government had just cancelled their Superconducting Super Collider (SSC) project. The SSC canceling was both an opportunity and a challenge for CERN in many ways. From a communications point of view, I can say, for witnessing the process in the first person, that 1993 actually marked the beginning of strategic communications at CERN.

My new position was a big challenge, as it involved professionalizing an existing “service” that was carried out mostly at amateur level by non-professionals. I immediately felt the need for training! And I stumbled by chance on the application form to enter the selection for the Master’s in Science Communication of SISSA, in Trieste. It was the summer of 1995 and by autumn I was enrolled in the first official year of SISSA’s pioneer Master’s, commuting one week per month from Geneva to Trieste.

This was the dawn of science communication, by definition a new profession. To sketch out an idea of the historical context, I summarize in Table 1 the milestones in the history of CERN since 1993, that marked historical turning points in the Laboratory’s communications’ activities and corresponding quantum leaps in its public visibility.

The succession of milestones in Table 1 shows that at CERN both the contents we need to communicate and the audiences reached have kept growing at a fast-pace and reached a larger and larger scale; the tools for communication also have had to be kept at the forefront of technologies (social media, visual tools, style, technologies...), constantly adapted to the latest progress.

How have I developed the necessary competencies, against the background of such a demanding and constantly changing context? The five years spent as personal assistant to the Director General gave me the opportunity of getting to know this complex organization from a privileged stance, at the top management level. However, when I was appointed a section leader in the newly created communications team, in 1995, I felt the need for specific training, in spite of my experience, knowledge of the laboratory and the subjects of its research, my writing and speaking abilities, my organizational and managerial abilities. I had already become too specialized, too far away from the target audience, I needed to learn the techniques to talk and catch the attention of a lay public and change linguistic register (although being a linguist by training myself!).

SISSA’s Master’s in Science Communication and Journalism did mark a turning point in my professionalism, transforming me into a fully-fledged communicator, but has not marked the end of my history of training needs! In a place like CERN, not only does a non physicist need to keep up with the variety of physics tools, experiments, small results and large discoveries, communities of users and the terminology that goes with them, but also with the evolution of the communication tools, strategies, priorities and external pressure from the media. This has involved pioneering new tools, a lot of learning on the job, and in some, rather rare cases taking short courses and following specific training, mostly outside CERN. One example of such courses is my attendance of a “*formation continue*” at the University of Neuchatel, to learn about fund-raising for non-profit organizations, a six months course for professionals, with attendance over the weekends. Specific training for professional communicators is basically non-existing in house. Our

**Table 1.** Brief history of science communication at CERN: milestones & tools.

| year | milestone  | description  | new tools   |
|------|--|--|---|
| 1993 | SSC (Superconducting Super Collider) project cancelled in the USA. | The Clinton administration cancels the SSC (Superconducting Super Collider) project after its construction had already begun in Waxhachie, Texas.<br>After the end of the Cold War, for the first time physicists need to “justify” their large projects, which cannot be taken for granted anymore. | Carlo Rubbia launches the LHC promotional campaign in crucial Non Member States, such as Japan, Russia, China, Brazil, Canada and the US (started in 1992).<br>His successor, Chris Llewellyn-Smith in 1994, decides to “professionalize” communications.   |
| 2005 | Angels&Demons  | Dan Brown’s novel staged at CERN reaches fame after the “Da Vinci Code” publication.   | Website “ <i>The true &amp; false of Angels &amp; Demons</i> ” published on CERN pages. One of the first examples of pro-active communications. This marked the first “quantum” leap in CERN’s popularity with the general public, as witnessed by the direct correlation between the IP addresses of viewers and the countries where book translations were published. |
| 2007 | Hollywood comes to CERN  | Angels & Demons director and cast come to CERN; ATLAS and LHC featured in the film.  | Agreement with SONY to include material on CERN in the film DVD.  |
| 2008 | LHC start up, Black Hole and doomsday                              | Black Hole story grows viral and “blesses” the start-up” of the LHC, making CERN world-famous.   | 10.09.08: First ever live event with world media on site during the first attempt to start the LHC. Nine hour long live aired via Eurovision. To date the most followed live event with audiences in hundreds of millions.  |
| 2008 | The LHC breaks down  | ... only 9 days after start-up!  | Opened You Tube channel and posted regular LHC News, with a host reporting about progress in the repairs in a journalistic style and simple language from the very sites where repairs were happening.  |
| 2012 | Higgs!   | Seminar to announce the Higgs boson discovery organized in less than a week’s time on July 4. Higgs theorists present.   | Live seminar and press event: 500K simultaneous IPs, 5 million Tweets and 17 000 articles in 108 countries and 5 continents.<br>For the first time a discovery is announced at same time in Physics Letters B and popular press.<br>The CERN brand conquers popular culture.  |

training programme includes very generic communication courses (how to make presentations, how to talk in public ...); in some cases we could get specific seminars, such as BBC professionals, regularly coming to teach scientists how to talk to the media, or specialists from the Science Museum in London leading workshops on exhibitions and impact evaluation. Training can also be provided “on the job”, sometimes as special internships in collaborating laboratories. This was the case for me in 1999, when I spent a month at the Exploratorium in San Francisco to learn how to produce Live Webcasting. I was also very lucky to be able to take “saved leave” from CERN regularly, to take part in TV productions on science with RAI, since 2003.

**Table 2. CERN Competency Model (2011).**

| Technical Competencies   |  |   |   |
|--------------------------|--|---|---|
| Domain                   | Subdomain  | Competencies                                  | Keywords  |
| Information technologies | <a href="#">Technical strategy and planning</a>        | Emerging technology monitoring                | The identification of new and emerging hardware, software and <b>communication</b> technologies and products, services, methods and techniques, improvements in cost/performance or sustainability. The assessment of their relevance and potential value to CERN and its services. The promotion of emerging technology awareness among users and management.  |
| Information technologies | <a href="#">Technical strategy and planning</a>        | Network planning                              | The creation and maintenance of overall network plans, encompassing the <b>communication</b> of data, voice, text and image, in the support of an CERN's overall strategy. This includes participation in the creation of service level agreements and the planning of all aspects of infrastructure necessary to ensure provision of network services to meet such agreements. Physical implementation may include copper cabling, fibre-optic, wireless, or any other technology.   |
| Information technologies | <a href="#">Technical strategy and planning</a>        | Solution architecture                         | The development and <b>communication</b> of structural frameworks (hardware, software and other components), which meet the present and future requirements of CERN. The design of solutions required to automate CERNs processes and resolve issues in a particular functional areas. The provision of direction and guidance on all technical aspects of the development of, and modifications to, information systems to ensure that they take account of relevant architectures, strategies, policies, standards and practices and to ensure that existing and planned systems and IT infrastructure all remain compatible. |
| Information technologies | <a href="#">Systems &amp; applications development</a> | Network design                                | The production of network designs and design policies, strategies, architectures and documentation, covering voice, data, text, e-mail, facsimile and image, to support overall requirements and strategy. This may incorporate all aspects of the <b>communications</b> infrastructure, internal and external, mobile, public and private, Internet, Intranet and call centres.  |
| Information technologies | <a href="#">Systems &amp; applications development</a> | Usability requirements analysis               | The establishment, clarification and <b>communication</b> of non-functional requirements for usability (for example, screen design/layout /consistency, response times, capacity). The analysis of the characteristics of users and their tasks, and the technical, organisational and physical environment in which products or systems will operate.  |
| Information technologies | <a href="#">Service &amp; systems operation</a>        | Customer Relationship Management              | On behalf of an organisation supplying IT and related products and/or services, the coordination of <b>communication</b> of services and delivery activities to one or more user groups or experiments; assistance to the groups to ensure that they gain maximum benefit from the services supplied..  |
| Information technologies | <a href="#">Service &amp; systems operation</a>        | IT Operations                                 | The operation of the IT infrastructure (typically hardware, software, information stored on various media, and <b>communications</b> ) required to deliver and support properly-engineered IT services and products to meet the needs of CERN. Includes preparation for new or changed services and the monitoring of performance of systems and services.  |
| Services                 | <a href="#">Communication</a>                          | Exhibition design and management              |   |
| Services                 | <a href="#">Communication</a>                          | Internal corporate <b>communication</b>       |   |
| Services                 | <a href="#">Communication</a>                          | Marketing, promotion, sponsoring, fundraising |   |
| Services                 | <a href="#">Communication</a>                          | Public relations                              | Managing the <b>communication</b> between the organisation and its public   |
| Services                 | <a href="#">Communication</a>                          | Relations with the media                      | Managing the <b>communication</b> between the organisation and the media  |
| Services                 | <a href="#">Communication</a>                          | Science writing, scientific popularization    |   |

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Clearly our internal training does not offer specific training, the programme has to cater for the dominant staff profile, i.e., research physicists, engineers, technicians and administrators. The official “competency model”, as updated in 2011 (thanks to our input) includes the keyword “communication” among the technical skills. Still, when doing a search in the competencies database using “communication” as the keyword, the first hits are IT-related (see Table 2).

In January 2016 a new management team started the first of a five-year mandate and a restructuring of CERN communications has taken place with the creation of a Director for International Relations who merged the previous two groups (Education and Communications) in a single larger group, the Education, Outreach and Communications group (ECO). A new communications strategy for the next decade is being defined, and an effort is underway to rewrite the competencies list to include more specific competencies. The new competency model *is* scheduled for discussion soon and the colleague in charge of re-writing the communications

competencies list has drafted a reviewed list of competencies for communications, which is clearly much more detailed, as it includes competencies<sup>2</sup> such as:

- Strategic communications planning (aligning communications strategies to the global strategies of the Organization and deriving implementation and delivery plans);
- Writing and editing;
- Audio-visual production (The production of film and still imagery, including 2D and 3D graphics and animation, to support the Organization’s strategic goals. Production of live events);
- Social media (Production of content, engagement with audiences and monitoring of social media channels);
- Community relations;
- Public affairs;
- Alumni relations;
- Fundraising;
- Evaluation (Developing and implementing metrics to measure and evaluate education, communication and outreach activities);
- Media relations (Managing the Organization’s relationship with the media and key commentators on science and related fields).

Today CERN’s communication landscape has become rather complex: from the LHC experiments’ outreach groups to the communication team of the laboratory’s Knowledge Transfer Unit, from specific EU projects (Marie Curie in particular) to the IT department’s communicators, not to forget the communications unit of the National Funding agencies in the Member States (such as INFN in Italy) and national labs (such as the Gran Sasso National Laboratory in Italy) ... everybody does communication, and the challenge is to stay tuned and work in synchrony. We all know the LHC adventure offered an exceptional time since its start up till the Nobel Prize to Peter Higgs and Francois Englert; the challenge now is communicating the unknowns of physics beyond the standard model, without any certainty in future discoveries and without the comfort of a well defined scientific theory, as the one supporting the Higgs boson discovery. In the post-Higgs era, we need to get ready to communicate results we might not even be able to understand entirely.

Challenges also come from the outside. There are major cultural changes underway within the new generations of communication tools. Communications is becoming more and more “participatory” through social media. As we can learn from The New York Times’ Innovation Report (<https://www.scribd.com/doc/224608514/The-Full-New-York-Times-Innovation-Report>), customization and distribution strategies are key for effective communications today: we need to get the audience involved before the story is published, we need to follow the latest trend of =>

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<sup>2</sup>At the time of writing, it is not known whether the newly drafted competencies will be included in CERN’s new competency model 2016.

public-powered story cycle. This entails investing into new formats and platforms, anticipating trends (mobile phones, 360° immersive videos and photos, live streaming through new challenging platforms such as “periscope”, blogging, tweeting... ) and doing it fast and constantly, as competition is very high.

Where can CERN communicators find adequate training? Clearly there is not a single course where key competencies for science communicators operating in such a fast changing challenging environment can be acquired. Our job will never be taught formally and finally by an academic course. Especially in a place like CERN, where the boundaries of knowledge are being pushed everyday further, learning is a daily activity for us in communications, while at the same time we are pushing the frontiers of our profession in the wake of science. My personal conclusion is that “continuous training” both on the job and through short intensive and very specialized courses are the only answer.

## Author

Paola Catapano is currently a section leader in CERN’s Education, Communications and Outreach group (ECO). Initially trained as a simultaneous interpreter at the University of Trieste, she joined CERN in 1990 as the personal assistant to Nobel laureate Carlo Rubbia, at the time director general of the Organization. In 1994 she became Head of Visits, Exhibitions and Public Outreach at CERN and joined the PCST network (Public Communication of Science and Technology) of which she was the chairperson from 2001 to 2004. In 1997 she obtained a Master’s Degree in Science Journalism from the International School for Advanced Studies SISSA, Trieste and started a parallel career as science journalist for Italian Media, still based at CERN. She has since contributed articles for the Italian press, both published and online, and worked as TV author and presenter for the Italian national television RAI, authoring and hosting over 30 science documentaries and reportages, often from extreme locations, such as the Arctic and Antarctica, the Atacama desert at 5000 m., the Amazonian rainforest and Galapagos islands, reported on the last but one Space Shuttle mission from the Kennedy Space Centre, among other exciting adventures. At CERN she has produced, written and hosted cern-tv’s flagship project the LHC news on <http://www.youtube.com/cern>, and covered all the events from the start up of the LHC in 2008 till the Higgs boson discovery in 2012, and the Nobel in Physics 2013. She has interviewed 35 Nobel Laureates. She is the author of two science books for children [http://medialab.sissa.it/minidarwinbrasile/10\\_01\\_libro.html](http://medialab.sissa.it/minidarwinbrasile/10_01_libro.html), travel blog: <http://minidarwin.blogspot.ch/> and [http://medialab.sissa.it/minivulcanologi/10\\_01\\_libro.html](http://medialab.sissa.it/minivulcanologi/10_01_libro.html). E-mail: [paola.catapano@cern.ch](mailto:paola.catapano@cern.ch).

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