

# Masterclasses in Science Communication: An international training programme for scientists and other professionals

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## Keywords

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## Summary

This paper seeks to highlight a significant shortcoming in the training of scientists and researchers. A survey of the experiences and needs of a sample of the scientific community has revealed a high level of interest in engaging with science communication projects, but there is a distinct lack of available training in why such projects are needed, and how to carry them out. Based on these findings, SISSA Medialab has developed a set of science communication Masterclasses for scientists, science communicators and other professionals. The content of these Masterclasses is outlined here, and the first stages of their evaluation are described. The courses are relevant across all scientific disciplines including astronomy.

## Introduction

In the last few decades, efforts to build a fruitful and long-lasting relationship between the scientific community, their audience and their stakeholders have intensified.

Public conferences, educational workshops, science exhibitions, science cafés, open days, teacher training courses, cit-

izen science projects and public consultations on controversial issues are just a few examples of the diverse activities that research institutions, in collaboration with other organisations and stakeholders, are becoming involved with. A variety of these activities are being developed and experimented with in order to attract the attention of different audiences and to engage them in a deep, open and culturally enriching dialogue.

Despite the growing importance attributed to the direct participation of scientists in science communication projects, many researchers are still not involved. There are many reasons for this, but lack of time and lack of institutional support are among the most frequently mentioned in national and international surveys. An additional problem that is often reported by scientists is the lack of specific training. Training to communicate science in an effective way is often completely absent in academic curricula, and only sporadically offered in specific programmes or courses.

Moreover, the variety and complexity of these activities necessarily require the participation of various people, with specific professional knowledge and expertise. The contact between these different professional communities, including the scientific community, is all too often non-existent.

This gap in training for the scientific community led the main institutions of the Trieste science system — the informal network of research institutes working in the Trieste region of Italy — to collaborate in a training programme aiming at empowering scientists and other professionals to develop cutting-edge science communication projects.

The project also gives individuals the opportunity to meet people from differ-



**Figure 1.** Time for peer-to-peer learning was reserved in all courses. Credit: SISSA Medialab.

ent countries and with different expertise, competences and experiences. In most cases science communication projects require the collaboration of multi-disciplinary teams, so learning to work in a varied team is a fundamental competence to be acquired.

The training scheme has been promoted by the International School of Advanced Studies (SISSA); the International Centre for Theoretical Physics (ICTP); the International Centre for Genetic Engineering and Biotechnology (ICGEB); and Elettra Sincrotrone Trieste, with the collaboration of the Architects' Association of the Friuli Venezia-Giulia region.

### Attitudes of scientists towards science communication

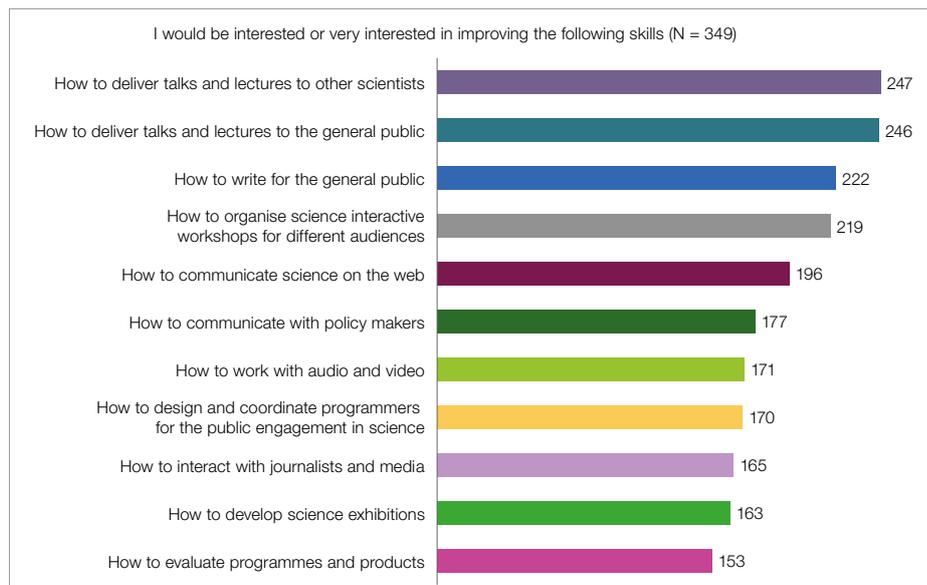
In order to develop a programme of courses for the main target group — the scientific community — SISSA Medialab carried out research to investigate whether, and to what extent, scientists were involved in science communication activities, what their interests in it were, and what they considered their training needs to be.

The online questionnaire, carried out in 2013, was sent to more than 1500 scientists, who had come from all over the world to attend conferences or seminars at the ICTP. A total of 420 answers were collected, mainly from physicists.

In general, scientists expressed a strong interest in participating in science outreach activities. Of those surveyed, 65% declared themselves to be personally involved in communication activities and only 5% reported that they are not and will not in future be involved in such activities. The remaining 30% considered that being involved in outreach programmes was a possibility.

Despite the interest in, and personal experience of outreach programmes, most — 68% — of the respondents declared that they had never attended a training course or seminar on science communication, supporting the claim that training in this area is not common practice.

Most of the scientists who participated in the survey declared that they would be interested in attending a course devoted to sci-



**Figure 2.** Personal skills that respondents would like to improve. Respondents were asked to assign a score from 1 (lowest) to 5 (highest) to their interest in the improving certain personal skills. This figure shows the results for the scores 4 or 5.

ence communication, with a particular interest from researchers working in Africa, Asia and Central–South America — with a percentage ranging from an average 65% to the maximum of 89% for African scientists.

The strong interest expressed by scientists from developing and recently developed countries towards science communication activities and courses is consistent with informal results from observations and evaluations of SISSA Medialab's many previous international courses. Over the past seven years approximately 3000 scientists, science journalists, museum staff and other professionals have participated in short international courses. Whilst developing these courses it has been found that researchers value science communication and science education programmes as a way of supporting the cultural, technological and economic development of their society.

The communication of science as a powerful tool to empower children and adults, especially from socially challenging backgrounds, also emerged in a qualitative evaluation performed by SISSA Medialab. In June 2014, PhD students and researchers involved in outreach activities in SISSA took part in focus groups to discuss their attitudes and needs after a year of training and experience in communicating their research. A major point that emerged from

the discussions was a feeling that communicating science can be a means of giving hope and opening up possibilities to people who do not have positive expectations for their future. Scientists coming from developing countries, or from areas that experience serious criminal and social problems, expressed strong feelings of responsibility towards the younger generation, often viewing engagement with the public as a moral duty and an empowering tool for the scientist.

The importance of a specific training in science communication emerged unanimously from the focus groups.

### Scientists' perceived training needs

Figure 2 ranks the survey respondents' interests in different skills. The interest in learning specific skills such as science writing or oral presentation is understandably higher in areas in which the scientific community is already more active.

Figure 4 shows the topics that survey respondents were interested in, and is harder to analyse.

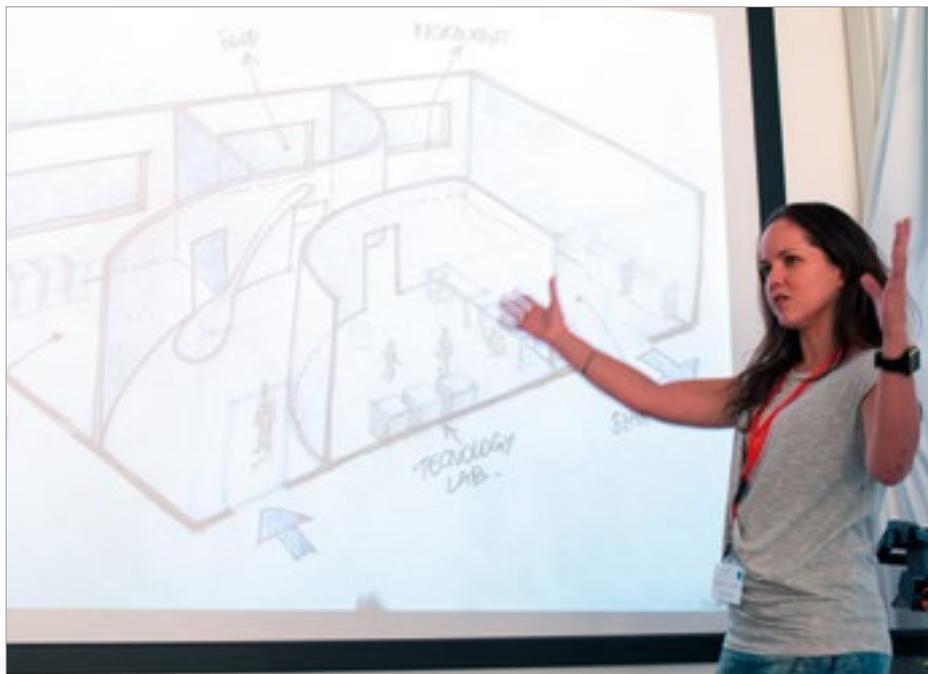
"Women in science" scored the highest for "very interested" (31.8%), while in second place participants declared themselves to be "very interested" in "Science museums

and science centres” (31.6%). However looking at the skills survey, the skill “to develop science exhibitions” did not score particularly highly. This expressed interest might indicate that respondents perceive science centres and museums as a fundamental actor in promoting, designing and delivering science dissemination activities, and therefore would like to know more about how they are established and operate, but are not as keen to learn to develop the exhibitions themselves.

### JCOM Masterclasses in Science Communication: Planning and delivery

The results of the online survey, the data from the evaluation surveys of previous courses and the qualitative research carried out on SISSA PhD students who are involved in outreach activities has been used by SISSA Medialab to develop a series of four international courses, to cover different areas of the communication of science<sup>1</sup>.

The courses are organised within the activities of the Journal of Science Communication (JCOM), an open access, peer-reviewed journal dedicated to science communication<sup>2</sup>. They are intensive one-week-long training courses held in Trieste, Italy, and aimed at scientists, managers of cultural institutions, public information officers, non-governmental organisations and com-



**Figure 3.** With the support of the speakers, participants can go through several steps of the exhibition planning, from the general idea to the design. Credit: Lisa Zillio (SISSA Medialab).

pany employees, and other professionals interested in science communication.

The main objectives of the Masterclasses are to disseminate best practice in public engagement; to facilitate contacts between experts at an international level and participants; and to promote peer-to-peer learning among attendees.

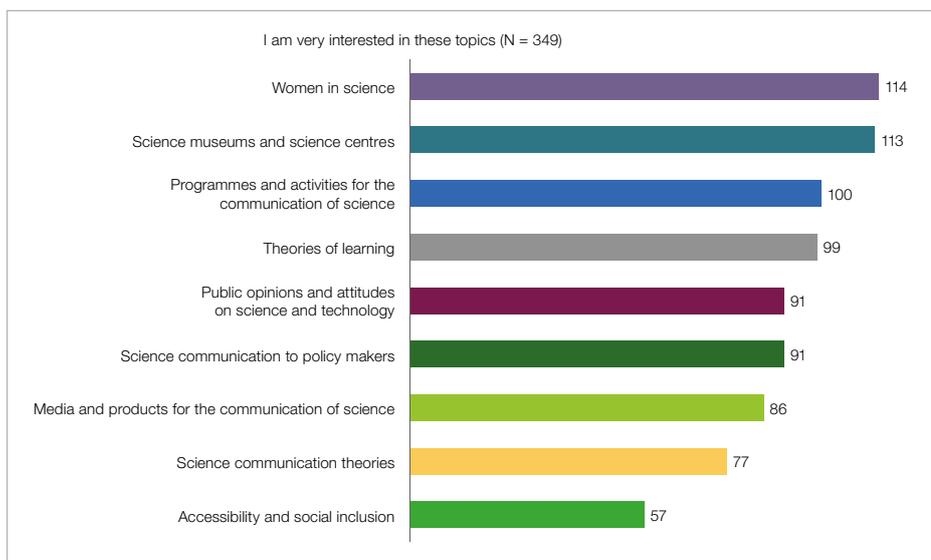
Grants to support participation in the course have been offered, thanks to SISSA, ICGEB and ICTP. In particular, the ICTP offered twenty grants to candidates working in developing countries, thus enabling the Masterclasses to respond to the strong interest expressed by scientists and professionals living in those countries.

The JCOM Masterclasses were advertised in the first six months of 2014 and received an enthusiastic response from the target audience. Two hundred and seventy six applications were received from 54 different countries for a maximum of 100 places.

### JCOM Masterclasses in Science Communication: Content

The courses were developed to encourage peer-to-peer learning and the exchange of points of view between different communities. Scientists, science communicators, museum staff, architects, designers and project managers brought together different skills, problems and experiences providing a crucial opportunity for shared learning.

In 2014 there were four courses for the JCOM Masterclasses:



**Figure 4.** Topics that respondents were most interested in. Respondents were asked to assign a score on a scale from 1 (lowest) to 5 (highest) to their interest in the different topics. This figure shows the results for the score 5.

- Facilitating the debate on the scientific and technological progress;
- Developing successful exhibitions;
- Developing successful museums and science centres;
- Communicating current research to different audiences.

All the courses present cutting-edge theories and methodologies, and offer innovative training in science communication. Speakers were chosen from among the most experienced professionals working at the highest international level. The diversity of topics has promoted the participation of people coming from different backgrounds and with different training needs.

The first course aimed to empower scientists, educators and museum staff to use new, participatory methodologies to involve the public in discussions about scientific and technological development, the impact on society, and any potentially controversial aspects of these developments.

The second and the third courses aimed to empower content developers, architects, designers and managers of exhibitions and museum-like institutions. In the same way that scientists lack formal training in science communication, other professionals — such as architects and interior designers — are very often not equipped during their academic studies to develop nar-



**Figure 5.** A group discussion among participants of the Masterclass. Credit: Lisa Zillio (SISSA Medialab).

ative, interactive exhibitions. The course addressed training needs that are not covered in universities and briefed participants on how to:

- define the mission and objectives;
- identify potential audiences and the importance of involving stake-holders;

- identify and plan appropriate spaces and facilities to meet the needs of the organisation and the visitors;
- plan and integrate programmes and associated facilities into the development;
- plan the work and organise teams using a project execution plan;
- develop the scientific content of an exhibition;
- incorporate visitors' needs into the design;
- develop a narrative through exhibits and objects;
- choose media and technologies;
- develop a content and design brief for architects and designers;
- plan the work and organise the team;
- and the significance of the brand in the proposed development, communication and marketing strategies.

The objective of the fourth course is to introduce basic science communication skills to scientists. These include oral presentation, science blogging and communication with policy makers, etc. It also includes cutting-edge aspects of contemporary science communication, such as science governance and risk communication.

A crucial aspect of the Masterclasses is the high level of interactivity. Participants are invited to share their experiences and the problems they face with their own pro-



**Figure 6.** Gender equality in high education and research was one of the issues discussed during the courses. Credit: SISSA Medialab.



**Figure 7.** All participants worked together to plan a very special exhibition about spoons. Credit: Lisa Zillio (SISSA Medialab).

jects, so that the speakers and organisers can give suggestions and guidance. A large part of the course is dedicated to projects that participants can develop under the guidance of the professionals.

### Evaluation and conclusion

Summative evaluations performed at the end of the first two courses — which are the only ones to have been delivered at the time of writing this paper — revealed a very high appreciation of the experience. Participants reported that they had gained theoretical knowledge, and acquired practical guidelines, new ideas and inspiration.

Participants were asked to rate the different sessions according to their interest in the topic; the relevance to their own work; the applicability of the content; and the quality of materials. On average, the course received a very high score — 3.6 and 3.7

out of 4 for the first and second course, respectively — and participants expressed their appreciation with personal comments.

The diversity of the audience was sometimes demanding and time-consuming during the group work, but all participants appreciated the opportunity to discover the different approaches of people from different backgrounds, experiences and nationalities.

The evaluation will be added to once the courses are complete and will be taken into account during the development of a second series of training courses for 2015.

### Links

- <sup>1</sup> The JCOM Masterclasses website: <http://jcom.sissa.it/masterclasses/>
- <sup>2</sup> Journal of Science Communication website: <http://jcom.sissa.it/about-jcom/>

### Biographies

**Valentina Daelli** is a science writer and science communicator. She has collaborated with SISSA Medialab on different projects, including research about the needs and experiences in science communication training for scientists and researchers. She obtained a PhD in cognitive neuroscience and a Masters in science communication at the International School of Advanced Studies, in Trieste, Italy.

**Paola Rodari** works for SISSA Medialab as a project manager for several national and international projects aimed at communicating science to different audiences. She has been the project leader for the development of Italian science centres, is on the steering committee of the Ecsite thematic group — THE group — dedicated to professional development for explainers, and teaches museum studies in the SISSA Masters in Science Communication. She is also the project manager of the JCOM Masterclasses international training courses.