

A New Generation of Scientists-as-Filmmakers: Experiences Gained in Switzerland

Science Communication

2019, Vol. 41(3) 369–377

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DOI: 10.1177/1075547019837620

journals.sagepub.com/home/scx



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Abstract

Film is one of the most powerful tools for communicating science to peers and the general public. Recently, there has been a boom in demand for science films. To satisfy the demand for science films, universities and scientific institutes are now increasingly teaching their scientists and students how to produce their own films via accredited science filmmaking courses, which now form part of science communication programs. These courses are producing what I define as *a new generation of scientists-as-filmmakers*—that is, scientists who integrate filmmaking into their academic preparation, albeit in a nonprofessional way. The aim of this article is (1) to describe the boom of this new generation of scientists-as-filmmakers and (2) to use common traits and conventions to classify and analyze the science filmmaking courses offered by Swiss universities and research institutes. This study could help promote a new generation of scientists-as-filmmakers and stimulate other countries to design specific programs for training scientists in science filmmaking.

Keywords

science communication, filmmaking, education, academies, storytelling, storyboarding, filmmaking marathon

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A major challenge facing all scientists is how to communicate complex concepts and detailed content in ways that are appealing to a wider audience. Film engages viewers visually, aurally, viscerally, and emotionally, thereby potentially reaching a vast audience (Berlin, 2016). Hence, scientists can benefit from the inspirational, educational, and motivational power of films to communicate their knowledge and expertise. Films are powerful tools of scientific communication and can be used in a number of different contexts ranging from a documentary record of fieldwork and laboratory experiments, via multimedia exposure and public exposition, to science outreach aimed at bringing the general public into closer contact with scientific research (Pasquali, 2006, 2007). Recently, there has been a boom in demand for science films (Kwok, 2018; Loverd, ElShafie, Merchant, & Gerbin, 2018). This expanding demand cannot be—and will never be—satisfied exclusively by professional filmmakers. Scientists can in many cases replace professional filmmakers, although the technical skills for filming and editing—as well as those required for developing strong narratives—lie beyond their academic training as scientists.

To satisfy the market demand for science films, universities and scientific institutes are increasingly running accredited filmmaking courses that form part of science communication programs to teach their scientists and students how to produce their own films. These science filmmaking courses are producing what I define as *a new generation of scientists-as-filmmakers*—that is, scientists who integrate filmmaking into their academic preparation, albeit in a nonprofessional way. This term is different from the idea of *scientists-turned-filmmakers* that describes scientists who make the transition from science to the world of professional filmmaking (Agrawal, 2001).

Although science filmmaking courses are becoming ever more popular worldwide, the global classification and analysis of these courses is complex since many are only advertised internally (i.e., within universities and research institutes). Hence, I have focused this analysis on the science filmmaking courses offered in Switzerland, where I teach on such courses and have firsthand knowledge of many others.

Since the 18th century, Switzerland has been one of the world's most productive nations in terms of scientific output (Kupper & Schaer, 2015). With a population of only 8 million, Swiss scientists have been awarded 21 scientific Nobel Prizes, thereby occupying the third position in the world ranking of the number of Nobel laureates per capita (BBC, 2010). Two Swiss universities, the Swiss Federal Institute of Technology and the École Polytechnique Fédérale de Lausanne, are in the top 20 of the Quacquarelli Symonds rankings; seven Swiss universities are in the top 200 in both the Quacquarelli Symonds and the Times Higher Education rankings (“Why

Does Switzerland Do,” 2014). Furthermore, Switzerland is the world leader in the number of the scientific publications per capita (Academia Stack Exchange, 2018); 39% of its publications are open access, and worldwide it occupies the top spot for open access publishing (European Commission, 2018). This success is partially attributable to researchers from other countries (57% of the total researchers) since Switzerland has the highest proportion of foreign researchers of any country in the world (Dessibourg, 2012). Thus, the experiences gained on science filmmaking courses in Switzerland could be useful in other countries that are currently exploring ways to involve scientists in filmmaking.

Science filmmaking courses in Switzerland vary greatly in name, duration, context, target audience, and goals, and so I have grouped them into three main categories based on their most observable traits and conventions:

1. *Theoretical science filmmaking courses* (usually called “storytelling and storyboarding science” and variations thereof)

In these courses, scientists learn storytelling, narrative and documentary modes, film genres, script, storyboarding, and the theory of film editing.

The main aims of these 2- to 4-day courses are as follows:

- a. To learn how to borrow communication strategies and techniques from film by incorporating the attributes of film narrative. This helps scientists prepare persuasive presentations and publications that will enthrall audiences and increase uptake.
- b. To encourage collaboration between scientists and professional filmmakers. Scientists should be trained to be able to translate their research into elegant and convincing cinematographic stories, thereby facilitating communication with filmmakers and helping them transform scientific stories into films.

In conclusion, knowledge of the language of storytelling and storyboarding has a direct application for science films (successful collaboration between scientists and professional filmmakers) and can also help improve oral and written scientific communications (Dahlstrom, 2014; Jones & Crow, 2017; Martinez-Conde & Macknik, 2017; Olson, 2015).

These courses are usually combined with visits to film festivals (e.g., Locarno Film Festival, Visions du Réel International Film Festival Nyon, and Global Science Film Festival; see Figure 1), which teach scientists how to analyze screened films from a storytelling point of view and give them the opportunity to discuss storytelling with professional filmmakers. This kind of



Figure 1. Photograph of the course *Storytelling and Storyboarding Science* held at the Locarno Film Festival in 2018.

Note. The course was organized by the Swiss Academy of Sciences and the Science Film Academy. Participants came from 12 Swiss universities and research institutes.

course does not require any special equipment (camera, lighting, sound recording, or editing) and so can accommodate a large number (up to 50) of participants (e.g., Swiss Academy of Sciences SCNAT, 2018).

2. *Practical science filmmaking courses* (usually called “filmmaking for scientists” and variations thereof including “video abstract” and “video journalism for scientists”)

In these intensive practical courses, scientists are taught to make their own films. Over 2 to 5 days, participants learn mainly how to operate cameras, handle lighting and sound equipment, and use editing software. The theoretical part (storytelling, storyboarding, and script writing) plays a secondary part since the core of these courses is the practical aspect of filming. The need for specialized teaching equipment (e.g., cameras, lighting and sound equipment, and editing software) limits the number of participants to 10 to 15 (e.g., Conférence Universitaire de Suisse Occidentale, 2018). Although the practical part of these courses consists of producing short films (video abstracts or video reports), their aim is essentially to practice filmmaking and not to produce per se films as a final product.

3. *Competitive-based science film production* (usually called “science filmmaking marathon” and variations thereof)

In these usually competitive 3- to 4-day courses, scientists and filmmakers (25–40 in number) work in small groups (e.g., four scientists and one filmmaker) to produce films. Either shortly before or during the course, some of these courses also teach scientists basic filmmaking techniques such as storytelling, storyboarding, scriptwriting, and how to operate camera, lighting, sound, and editing equipment. At the end of the marathon, the resulting films are usually screened before the public and a jury. Awards are given to the best films. Some of these filmmaking marathons are intensive, while others have long intervals between sessions (i.e., 4 intensive days of work spread out over a period of 2–3 months) and aim to give scientists more time to produce films related to their work (e.g., Swiss Academy of Sciences SCNAT, 2017). The drawback is that scientists do not necessarily learn how to make films themselves as they still have to rely on filmmakers. Scientists mainly provide the ideas and possibly the story, while the filmmakers take charge of the actual making of the films.

Although the participants in these three main categories of science filmmaking courses are mainly PhD or postdoctoral students, some courses also accept undergraduate students, research assistants, and academic staff. Participants usually receive 1 to 2 credit points depending on the duration of the course.

Since 2014, a total of 13 Swiss universities and research institutes have organized annually one or more types of science filmmaking courses (Table 1) that have become popular among scientists. They are quickly booked up, and there are long waiting lists, as occurred on my recent course “Storytelling and Storyboarding Science” at the Conférence Universitaire de Suisse occidentale CUSO (Universities of Geneva, Lausanne, Fribourg, and Neuchatel): It accommodated 14 PhD students, and there were 17 more students on the waiting list. This encouraged the organizers to offer a second course that ran at the same time. Films produced during the courses are usually uploaded directly onto the organizers’ YouTube channels and are visited hundreds of times. Films from the filmmaking marathons are often screened and discussed with the wider public in special events in city cinemas. For example, the best films from the filmmaking marathon in Zurich were shown in a cinema—which sold out—to 270 spectators during the Global Science Film Festival of 2017. The most important aspect of these filmmaking courses is not the films that are produced per se; rather, the key is that the scientists that attend filmmaking courses will go on to produce their own films after the courses even if they lack full professional funding.

Table 1. Details of the Analyzed Science Filmmaking Courses Offered by Swiss Universities and Research Institutes Since 2014.

Course name (with some variations)	Course content	Practical parts	Film outcome	Competition based?	Duration	Main target public	Number of participants	Credit year of course	First year of course	Course organizers	References
Storytelling and storyboard science	Storytelling, script, and storyboarding techniques. How to transform scientific narratives into film stories. How to communicate with professional filmmakers	Attending film festivals to watch and analyze screened films and talk with filmmakers about their stories and storyboards	No	No	2-4 days intensive + attending film festival	Very wide range: undergraduate, master's, PhD, and postdoctoral students; associate researchers; and lecturers	10-50	2	2017	Swiss Academy of Sciences, Diactica (ETH and Zurich University), Department of Evolutionary Biology and Environmental Studies (Zurich University), Locarno Film Festival and Global Eco Film Festival	For example, Swiss Academy of Sciences SCNAT (2018)
Filmmaking for scientists	No filming exercises	Filming interviews or simple short films	No	No	2 days intensive	Not only PhD students but also postdoctoral students are considered		1	2016	Conférence des Universités de Suisse Occidentale (Universités de Genève, Lausanne, Bern, Fribourg, and Neuchâtel), Paul Scherrer Institute	For example, Conférence Universitaire de Suisse Occidentale (2018)
	With filming exercises	Producing short films, video abstracts, and video reports	Yes, but with very limited resources and time	No	4-5 days intensive		10-15	2	2014	Life Science Zurich (ETH and Zurich University), Basel University (GRACE), and Zurich-Basel Plant Science Center (ETH, Zurich University and Basel University)	For example, Basel University (2018)
Filmmaking narration	Scientists are taught the basics of filmmaking	The basics of filmmaking (storytelling, script, storyboarding, and editing techniques. How to work with camera and lighting and sound equipment). Scientists and filmmakers produce short films	Yes, but with limited resources and time	Typically, yes	4 days intensive	Not only PhD students but also master's and postdoctoral students and researchers are considered	25-40		2016	Swiss Academy of Sciences, Life Science Zurich (ETH and Zurich University), Conférence des Universités de Suisse Occidentale (Universités de Genève, Lausanne, Bern, Fribourg, and Neuchâtel), Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), European Science Foundation (BioScience Network, Lausanne) and The Centre for Swiss Film and Institute of Arts, Science & Technology (EAWAG), Science Film Academy	For example, Swiss Academy of Sciences SCNAT (2017)
	Nonintensive	Scientists, filmmakers and artists produce short films	Yes, but with enough time	Yes	4 days distributed over 2-3 months	Mainly PhD and postdoctoral students			2018		
Scientists are not taught the basics of filmmaking			Yes, but with limited resources and time	Yes	3 days intensive			1	2016		

These scientists produce films that can be used to publicize their research, present theses, or as video abstracts for submitting with their publications to publishers such as Elsevier, Cell Press, Wiley, and Taylor & Francis, all of whom now encourage the submission of video abstracts.

Since the early days of cinema, filmmaking has evolved from a subordinate role vis-à-vis science to a position as an equal partner in the production of knowledge (Gouyon, 2015). Today, the new generation of scientists-as-filmmakers—albeit nonprofessional—will have an important role in the coming era of science communication to peers and the general public.

Nevertheless, there are still many obstacles to be overcome in the task of promoting a new generation of scientists-as-filmmakers and the consolidating of the science filmmaking courses that will teach them. A general consensus exists within the scientific community that outreach training is needed (Leshner, 2007) and that training in science filmmaking should be a top priority. Films should become more widely accepted as legitimate contributions to scientific journals (e.g., *Journal of Visualized Experiments*; Assadi & Gasparyan, 2015). Scientists-as-filmmakers will surely benefit from the organization of science film festivals in which they can screen their films and discuss their results with their peers and other scientists-as-filmmakers (Bultitude, McDonald, & Custead, 2011; Hoffman, 2008). The boom in science films and filmmaking courses encouraged me to set up and direct a major science film festival (Global Science Film Festival) as a platform for this new generation of scientists-as-filmmakers emerging in Switzerland and for the screening of their films and promoting discussions with professional filmmakers and the public. The Global Science Film Festival screens films in three categories: two categories for professional filmmakers (feature-length and short films) and one category exclusively for the films produced by this new generation of scientists-as-filmmakers.

Author's Note

Some of the science filmmaking courses offered in Switzerland may not be included in my study simply because I was not aware of them. Many universities and research institutes advertise their educational courses only internally, and so they are difficult to find by searching on the Internet. However, I believe that my article is representative enough of the courses taught in Switzerland over the past 5 years. I note that the term *scientists-as-filmmakers* was first used by Agrawal (2001).


Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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Author Biography

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