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Introduction: From "The Popularization of Science through Film" to "The Public Understanding of Science"

Fernando Vidal

ICREA (Catalan Institution for Research and Advanced Studies); and CEHIC (Center for the History of Science), Autonomous University of Barcelona
E-mail: fernando.vidal@icrea.cat
https://icrea.academia.edu/FVidal

Science in film, and usual equivalents such as *science on film* or *science on screen*, refer to the cinematographic representation, staging, and enactment of actors, information, and processes involved in any aspect or dimension of science and its history. Of course, boundaries are blurry, and films shot as research tools or documentation also display science on screen. Nonetheless, they generally count as *scientific film*, and *science in* and *on film* or *screen* tend to designate productions whose purpose is entertainment and education. Moreover, these two purposes are often combined, and inherently concern empirical, methodological, and conceptual challenges associated with *popularization*, *science communication*, and the *public understanding of science*. It is in these areas that the notion of the *deficit model* emerged to designate a point of view and a mode of understanding, as well as a set of practical and theoretical problems about the relationship between science and the public.

Two reports, from the late 1940s and the mid-1980s, may be used to chart this relationship in the second half of the twentieth century. Though written in English by British authors, they express the concerns that sustained the emergence of "public understanding of science" (PUS) as an international field of academic inquiry, public policy, and institutional initiative. The first one, "The Popularization of Science through Film," was prepared in 1949 for what was then the Division of Science and Its Popularization of the United Nations Educational, Scientific and Cultural Organization. It opened by noting, "A great deal is … expected of popularization, ranging from outright instruction to the presentation of the more fundamental problems of application and control which confront the modern citizen" (Elton and Road 1949, 1). Yet, it added, popularization "must contend with all the false attitudes about science which cheap fiction and other popular forms of entertainment have built up and constantly maintain" – in particular "the rather frightening remoteness of the white-coated scientist working in the secret quiet of his laboratory" (ibid., 3). The conventions and expectations of film as a form of entertainment therefore seemed to undermine the medium's educational prospects.

"The Popularization of Science through Film" expressed a view of science communication and the relationship between science and the public that in the early 1990s became associated with the label "deficit model."[1] This so-called "model" makes *public understanding of science* coincide with *scientific literacy*, that is to say "with the ability to understand science 'correctly' as it is communicated by the experts"; it assumes "that this understanding, once achieved, guarantees favorable attitudes toward science and technological innovation"; and it tends "to problematize the relationship between science and the public only as regards … the public" (Bucchi and Neresini 2007, 450).[2] These features persist in "The Public Understanding of Science," a 1985 report for the Royal Society. Otherwise known as the *Bodmer Report*, it is recognized as a crucial moment for the PUS movement, but also criticized for taking the deficit model as the norm for science communication, understood as a one-way transmission of information whose effects can be measured through scientific literacy surveys (Gouyon 2016a; Petrelli 2003; The Royal Society 1985).

In a seminal 1990 article, sociologist of science Stephen Hilgartner argued that, in its excessive simplicity, the two-stage model (scientists produce pure and genuine knowledge, which popularizers then make easy for the public) "serves scientists (and others who derive their authority from science) as a political resource in public discourse" (Hilgartner 1990, 519–520). Historians see things similarly, but treat the deficit model, the inevitable gap between science and its publics, and more generally the issues surrounding science popularization and science in popular culture as part of the historical dynamics of science itself (Nieto-Galan 2016; Secord 2004; Topham 2009).[3] That "gap" also follows from the structure and operation of mass media (Florensa, Hochadel, and Tabernero 2014; Thompson 1995) – to begin with, because, as directors and producers of scientific content in film and television emphasize, there is no such thing as science film or television, just film or television (Dugan 2014; Montserrat 2014).

[1] Two articles of 1991 are often mentioned in connection with an early use of "deficit model," but are not singled out as originating it (e.g. Bucchi and Trench 2014). From the beginning, the label was intended as a critique. Wynne (1991, 113) advocated leaving behind "a simple 'cognitive deficit' model of the public understanding of science," and Ziman (1991, 101) spoke of the "simple 'deficit' model, which tries to interpret the situation solely in terms of public ignorance or scientific illiteracy." Both criticized the "model" and used quotation marks without furnishing references for their use of the expression. The deficit model is sometimes also called "diffusionist" or "dissemination" model.

[2] "Scientific literacy" was first used in the U.S.A. in the late 1950s (DeBoer 2000; Laugksch 2000; Miller 1983.

[3] Writing on that "gap," Shapin (1990, 994) notes that at the time of the Scientific Revolution neither were the mathematical practices public, nor "were public comprehensibility or public participation said to be necessary for their truth and power to be granted. Seventeenth-century practitioners therefore lived with the tensions intrinsic and extrinsic to at least two forms of relationship between science and the public. Only occasionally did these tensions manifest themselves. By the nineteenth century, certain of the divergences between public conceptions of nature and those said to be proper to legitimate science were being systematically addressed" (ibid., 996).

The Resilience of the Deficit Model

Both as an analytic tool and as a principle of communication practice, the deficit model has been under attack since the 1990s. Critics underline the extent to which it oversimplifies the processes involved in popularization, how labeling target audiences as "scientifically illiterate" reinforces power relations, or how attempts at reducing people's knowledge deficiencies may neglect those people's interests and contexts. They also observe that while scientists actually negotiate among themselves notions of good science, scientific literacy surveys tend to assume a predominantly Popperian view of science, and obliterate the circumstances that shape how *science*, *theory*, or *experiment* are understood (Wynne 1995). On the ground, even allowing for a diversity of criteria for assessing it, the level of scientific literacy has remained stable since the late 1950s (Sturgis and Allum 2004). In 2014, according to the *Science and Engineering Indicators* established annually by the U.S. National Science Foundation, respondents were on average able to answer correctly 65 percent of N.S.F.'s factual knowledge questions, a score nearly identical since 1992. As for "pseudoscience" (a constant category in the *Indicators*), the percentage of respondents who consider astrology unscientific was 65 percent in 2014, and ranged between 50 percent in 1979 and 66 percent in 2004 (National Science Board 2016, chap. 7, 41–42). European surveys show an overall picture of increasing knowledge over time, but with significant variations for example, in Italy there is a decline from the generation of the 1960s to that of the 1980s, while in the U.K., the Baby Boomers, born between 1950 and 1962, score above later cohorts (Bauer 2009, 232–233).

Scientists remain critical of media coverage, see the public as "uninformed about science and therefore prone to errors in judgment and policy preferences," and believe that they should "have a role in public debates and view policy-makers as the most important group with which to engage" (Besley and Nisbet 2011, 644). A 2013 survey among members of the American Association for the Advancement of Science reveals that "defending science" and "informing the public about science" were their chief goals in engaging online with the public (Dudo and Besley 2016); another survey with the same constituency showed that 84 percent of respondents saw the public's lack of knowledge about science as a "major problem" (Funk and Rainie 2015; Rainie and Funk 2015). The 2013 survey also uncovered a sizable opinion gap between scientists and the general public on a range of science and technology topics, with the largest difference found in beliefs about the safety of genetically modified (GM) foods.

In Europe especially, public suspicion has been long documented: in connection with DDT in the 1960s, nuclear power in the 1970s and 80s, farming and food technologies following the "mad cow disease" scandal in Britain in the 1990s, and gene technologies in the 2000s (Sturgis and Allum 2004, 56–57). Contrary to what science policy-makers generally suppose, distrust does not derive primarily from ignorance. High exposure to science in the media does not significantly reduce opposition to biotechnologies, and high levels of information do not guarantee positive attitudes towards GM foods, embryo research, or cloning for reproductive purposes; rather, they correlate with calls for stricter government regulation (Bucchi and Neresini 2002; 2004; TNS 2010).

In short, public attitudes to science do not primarily depend on science literacy, and closing information gaps does not make people change their minds. In fact, individual perception is guided primarily by the congruence of beliefs with cultural commitments. That is why, in the exemplary case of the environment, "simply improving the clarity of scientific information will not dispel public conflict so long as the climate-change debate continues to feature cultural meanings that divide citizens of opposing world-views" (Kahan et al. 2012, 734). Hence the call for scientists to "stop thinking explaining science will fix things" (Requarth 2017).

While the modest achievement of campaigns at increasing science literacy cannot be attributed exclusively to their having been conducted in a "deficit" perspective, it has conspired with other grounds for criticism, such as those mentioned above, to spawn alternative models (Trench 2008). Like accounts developed in a deficit framework, these alternatives are simultaneously descriptive, theoretical, and normative. Their authors generally wish them to displace the deficit model not only at the factual level, by providing more nuanced depictions of science communication in society, but also at the normative level, by offering guidelines for science communication to scientists, policy-makers, media professionals, and the public itself. (A parallel theorization of lay people's participation in the governance of technoscience has taken place in STS since the 1990s; e.g. Callon 1999; Jasanoff 2003.)

At least three other models have developed (Brossard and Lewenstein 2010). A *contextual model* calls attention to how publics process information according to experiences, contexts, and circumstances. A *lay expertise model* values local knowledge and seeks to empower local communities. This has in turn furthered the emergence of a *public engagement model* that advocates citizen participation, the "democratization" of science, and the "dialogue" among "stakeholders." The practice of science communication remains nonetheless concerned with knowledge as defined by professional scientists; and, as illustrated in a study of outreach schemes related to the ethical, legal, and social implications of genome research, parts of each model may be adopted within one same scheme to suit different contexts (ibid., 31–32).

In media studies, PUS, and science communication, theorizing has moved toward an emphasis on dialogue and public participation (Bucchi 2008) and a focus on how people make sense of information depending "on prior knowledge and on their social and cultural locations" (Marks 2009, 1). Those fields as a whole are said to have evolved from the deficit model to approaches that give priority to open deliberation and allow citizens to impact on science, scientists, and policy. Communication is no longer conceptualized "as a flow of knowledge or values from one party to another," but "as a constitutive force in shaping entities such as science, publics and society" (Horst and Michael 2011, 285, 286). In 2002, a group of British scientists even announced that the term "public understanding of science" had outlived its usefulness, and proposed a "more inclusive-sounding replacement: public engagement in science and technology."[4]

[4] "From PUS to PEST," *Science* 298(5591) (2002):499b.

The development "from PUS to PEST" has since become the grand narrative officially adopted "across continents and by governments, scientific societies, intergovernmental bodies, civil society organizations and many more interests" (Trench 2008, 120). As an editorial in the journal *Public Understanding of Science* put it in 2007, "We have clearly moved from the old days of the deficit frame" (Einsiedel 2007, 5). This narrative, however, conveys above all an ideal: experienced observers of the field report "a sense of old issues and familiar tracks," and wonder whether they "have been moving forwards or in circles" (Irwin 2014, 71). Though in purer form in China and Latin America than in Europe and North America, deficit-style educational strategies prevail worldwide in research funding bodies (Palmer and Schibeci 2017). The PUS community itself has come to see the deficit model as so resilient that the same journal, which in 2007 proclaimed its passing, launched in 2015 an essay competition on the question, "Why does the 'deficit model' not go away?" (Bauer 2016, 398).[5]

One of the winning articles explained the model's persistence by factors such as scientists' conviction that information is rationally processed or their simplistic views about both communication and the public, as well as by the model's utility for policy design (Simis et al. 2016). Another pointed to the "absolute epistemic privilege" granted to science (Suldovsky 2016). Critiquing such privilege is consistent with the deficit-to-participation-and-dialogue narrative, but does not explain the model's endurance. For that, as another article suggested, we may need to understand epistemic asymmetry as intrinsic to science communication (rather than as a failure), and shift the focus from "deficit" as a problem to the question of how scientists and communication professionals become credible (Cortassa 2016; see also Cortassa 2010).

Scientists, for their part, have also called for a renewal. Especially anxious with regard to "gaps in knowledge about effective science communication when science related to contentious issues is involved in public controversy," a 2017 report of the U.S. National Academies of Sciences, Engineering, and Medicine reckons that "the most widely held, and simplest, model of what audiences need from science communication – what is known as the 'deficit model' – is wrong," emphasizes "the importance of building a coherent science communication research enterprise," and calls for a "systems approach" aimed at determining "communication approaches work best under which circumstances" (NAS 2017, 13, 3, 8). In short, being wrong has not prevented the deficit model from staying alive.

What about Film?

A fuller picture of "science *in* film and the deficit model" as a problem of transmission practices and a research question for science studies requires pointing out that "science

[5] The six winning papers were published in *Public Understanding of Science* 25(49), May 2016.

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and film" defines a broader area of inquiry.[6] Not merely to suggest that the issues surrounding science and the deficit model are just another object of science studies, but also to contrast the direction in which science studies have moved with the attitude that prevails among scientists, scientific institutions, and science advocacy and communication initiatives.[7]

As a number of historical case studies have demonstrated, since the beginning of the cinema in the late 1890s "scientists experimented with it by tinkering with film, film cameras, microscopes, and the parameters of exposure, magnification, and time" (Landecker 2006, 121). Film became a medium for recording and analyzing experiments at the microscopic and the macroscopic level in disciplines ranging from astronomy to psychiatry. In contrast to photography or drawing, it offered the possibility of capturing phenomena over time, thus realizing "cinematographic desires" that had since the 1860s inspired chronophotography and various attempts at combining photography with devices to produce moving images, such as magic lanterns, phenakistiscopes, and zoetropes (Canales 2011). Experiments in film were not only a way to show cells or particles in motion; they also allowed nonscientist spectators "to participate visually in the sights of scientific work" and, beyond the laboratories, fashioned a new way of looking at the world (Landecker 2006, 123). For example, if Lisa Cartwright is right, the mode of visuality at work in early scientific cinema constituted a form of medical surveillance and social control parallel to the use of photography to classify and diagnose, and was inseparable from the development of the cinema "as a popular cultural institution and a technological apparatus;" thus, the filmic study of bodies in movement operated "as an intertext between popular and professional representations of the body as the site of human life and subjectivity" (Cartwright 1995, 3, 4, and chap. 1). While in the late nineteenth century some disapproved of the mixture of film as a scientific tool and as an increasingly central element of mass culture, the historical fact is that science and film companies were linked from the very origins of motion pictures; that the cinema was not only a social event and a form of entertainment, but also "a new structure of relating the inter-subjective with the objective" (Wellmann 2011, 314); and that, in spite of the "mad scientists" who proliferated since the 1920s, filmic forms, from the scientific to the educational to the recreational, are better seen as a continuum than as a rigid hierarchy (Ritzmann, Schmutz, and Wolff 2009).

A major insight of historical inquiry into science and film is therefore that, from the start around 1900, "motion pictures were comprised of a tangled web of factual

[6] I here use "science studies" to encompass any non purely philosophical way of examining the universes of science and technology and their contexts; no methodological preference is implied, and no positioning is intended in debates around the demarcation of science studies, the history of science and STS (on which see Daston 2009 and the reply by Dear and Jasanoff 2010).

[7] The references given here are highly selective and privilege synthetic views of their subject. See in addition the special journal issues "Moving Images: Film in Medicine and Science – Medicine and Science in Film," *Gesnerus* 66(1), 2009, edited by Iris Ritzmann, Hans-Konrad Schmutz und Eberhard Wolff; and "Cinematography, Seriality, and the Sciences," *Science in Context* 24(3), 2011, edited by Janina Wellmann.

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registration, subjective authorship and public entertainment" (Bonah and Laukötter 2009, 140). Science thus turns out to be part of the early history of cinema as much as cinema crucially contributed to turn science into a public phenomenon. The "cine-scientists" of the first half of the twentieth century developed film-making "as a legitimate technique for scientific investigation" while at the same time producing footage for non-specialist audiences; they faded after World War II, and from the early 1960s onwards, the broadcasting of science tended to move into the hands of TV and film producers (Gouyon 2016b, 19, 21). This involved an aesthetic and epistemological change.

Earlier documentary was characterized by a firm commitment to observational realism, or "a set of formal markers that confirm to us that what we are watching … is a record of an ongoing, and at least partly media-independent, reality" (Corner 2015, 149). Developments from the 1960s opened the way for reconsidering artifice: a potential source of fakery turned into an indispensable tool for a film to work as evidence. Thus, in the major genre of wildlife documentaries, animal performances may be carefully staged, and it is through such staging that knowledge considered genuine is produced (Gouyon 2016c). Beyond the usual part of fiction contained within the documentary (Besson and Leblanc 2009), fiction here becomes a means of producing facts. At the same time, as David Kirby noted, though scientists welcomed audiovisual media as ideal popularization tools, the history of science in cinema, radio, and television

> reveals a tension within the scientific community between those who saw in them the promise of universal education and those who were suspicious that their commercialized nature meant foregrounding entertainment over authenticity. This tension led to frequent clashes between the scientific community and media producers as scientists attempted to exert control over media content. Scientists also tried to establish clear boundaries for categories that were never stable, such as fiction vs. non-fiction, art vs. science, natural vs. artificial, science vs. sensationalism, and research vs. entertainment. (Kirby 2016, 428)

Thus, whether as consultants, producers, or commentators, scientists remain attentive to the consistency between the facts produced by the fiction and the science done outside the studio, and wish to have some control, even if indirect, over science on screen.

Usually under a less Manichaean guise, the situation Kirby describes in the past tense is still with us. In spite of the 2017 report of the U.S. National Academies of Sciences proclaiming the deficit model "wrong," its basic impetus continues to provide implicit or explicit motivation for initiatives by major science advocacy organizations. In 1997, the Alfred P. Sloan Foundation, which funds research and education in science, technology, engineering, mathematics, and economics, instituted a Film Program that "aims to influence the next generation of filmmakers to tackle science and technology themes and characters, to increase visibility for feature films that depict this subject matter and to produce new films about science and technology and about scientists, engineers and mathematicians"; the Foundation also sponsors the Sundance Institute's

Science-in-Film Initiative, and awards a prize for a film focused "on science or technology as a theme, or depicting a scientist, engineer or mathematician as a major character."[8] Founded a decade later at Rockefeller University, Imagine Science Films has become a venue "for the release of new and experimental works bridging the worlds of science and film," and through annual festivals in New York, Paris, and Abu Dhabi, and at satellite events worldwide, it "cultivates an appreciation of science" and supports "those who want to communicate the scientific realities of our world to public audiences."[9]

In 2008, the U.S. National Academy of Sciences launched The Science & Entertainment Exchange to connect "entertainment industry professionals with top scientists and engineers to create a synergy between accurate science and engaging storylines in both film and TV programming" and "to use the vehicle of popular entertainment media to deliver sometimes subtle, but nevertheless powerful, messages about science."[10] Since 2013, in the U.K., the Wellcome Trust's Screenwriting Fellowship program offers a screenwriter or a writer/director the opportunity to "explore the intersection between cinema and science," and expects the fellow to "act as an ambassador for the Wellcome Trust in the film industry."[11] And in the framework of the UNESCO City of Film program, the Science Foundation Ireland provides funds "to facilitate, promote and increase the inclusion of science, technology, engineering and maths (STEM) content in Irish film and TV production," in the hope that scientific research "will inspire filmmakers to make films that are informative, creative and the start of a whole new wave of film and science projects."[12]

While recognizing science as a valuable source and vehicle for filmmakers' creativity, these initiatives consider the cinema mainly as a resource for science as sanctioned by professional experts. Celebrating the global multiplication of science film festivals, a *Nature Physics* editorial of 2009 summarized the goals pursued and the values at stake when it defined "a good science film" as "a good film in which good (correct) science is central to the plot, or at least has a strong supporting part."[13] Such statements assume a hierarchical chasm between expert scientific culture and the lay reception of knowledge, and illustrate the persistence of concerns about accuracy at the highest level of policy-making. Thus, while not exactly an "institutionalized 'police force' for

[8] http://scienceandfilm.org/film, https://www.sundance.org/initiatives/science-in-film. Also supported by the Sloan Foundation, the Science on Screen initiative funds "independent cinemas to bring science education to the movies" and promote "scientific literacy through entertainment, with focus on underserved communities" throughout the U.S. See http://scienceonscreen.org/. All sites last accessed December 15, 2017.

[9] http://imaginesciencefilms.org/. Last accessed December 15, 2017.

[10] http://scienceandentertainmentexchange.org/. Last accessed December 15, 2017.

[11] wellcome.ac.uk/what-we-do/our-work/wellcome-screenwriting-fellowship-partnership-bfi-and-film4 (last accessed December 15, 2017.

[12] https://en.unesco.org/creative-cities/events/science-screen-when-film-meets-sciences (last accessed December 15, 2017).

[13] "Science on Film" 2009. *Nature Physics* 5:703.

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detecting and sanctioning counterfeit claims" (Hilgartner 1990, 534), they do embody an effort to preempt misrepresentations and further the interests of science by actively participating in film production. In a deficit perspective and with a self-protective aim, they acknowledge sociologist of science Peter Weingart's remark that motion pictures have become the "prototype of the mediatization (*Medialisierung*) of science" and that no other medium manages better than the cinema to blur the boundary between reality and fiction with regard not only to the performative representation of facts, but also to interpretations that are in principle the preserve of science (Weingart 2005, 33). Such blurring of boundaries decisively contributes to how science on screen shapes subjectivities more deeply than any informational content: for example, as recently documented, participants in clinical trials use vague memories of film and TV representations (in both horror and comedic modes) to manage worries and emotions connected to their decision to enroll in biomedical research (Cottingham and Fisher 2017; the representations themselves are studied in Fisher and Cottingham 2017).

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The notion of mediatization is meant to emphasize the interplay between media, culture and society, as well as the role of the media as agents of social and cultural change (Hepp, Hjarvard, and Lundby 2015). The present collection of articles on *Science in Film and the Deficit Model* implicitly takes mediatization in that sense as a point of departure, and builds on the observation that film, and since the mid-twentieth century, television and other forms of image-based mass media, play a range of active roles in the production and circulation of scientific knowledge. While there is a manifest and inevitable "gap" in information and knowledge between experts and non-experts, and while it is obvious that media may misrepresent science and dumb down scientific content, resolving such issues is not the object of dealing with science in film as one way of studying science in context. The object is rather how movies, in their different forms, genres, and distribution or consumption platforms, help unravel the complex processes of scientific knowledge production and management.

From different perspectives and by way of various empirical materials, the contributions that follow transcend the intractable problem of accuracy and contest the associated dichotomy between information and entertainment that underpins the deficit model. Three articles focus on the documentary genre: Examining in particular the *Planet Earth* series that debuted on the BBC in 2006, Eleanor Louson demonstrates how spectacle, often judged as a capitulation to entertainment and an insult to accuracy, prolongs the earlier natural history display of museums by generating an "affective" form of knowing that is not necessarily incompatible with the transmission of informational content. Felicity Mellor, in turn, focuses on two documentaries about time to show how decisions about style, which are neglected in a deficit perspective, inflect science with different meanings. Both productions, released in 2010 and 2011,

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feature astronomers' and physicists' understandings of time. One, however, was created for the cinema and the other for television; the constraints, traditions, and conventions of each support, combined with authorial choices about visual and narrative structures and strategies, give rise to contrasting results – one staging a finalized body of knowledge to which spectators have little to contribute, another suggesting a dispersion of epistemic authority and conveying the uncertainties involved in producing knowledge. In the third article dealing with the scientific documentary, Carlos Tabernero traces the evolution of the genre during Franco's dictatorship in Spain (1939-1975). Early documentaries concerning health and medicine in the Spanish African possessions legitimized the regime by underlining its benevolent nature and the modernizing effects of colonization. In the 1960s and 1970s, while also including the basic elements of a deficit model of communication and expressing trust in a scientifically driven modernization, the work of the prolific film, radio, and television author, producer, and director Félix Rodríguez de la Fuente opened up to the public and relaxed, at least formally, the epistemic hierarchies. The documentaries of both periods fulfilled an eminently political role, which was inseparable from the epistemologies they implicitly conveyed – and, in this case, of changes in Franco's regime with the end of the ideology of autarky and a turn toward a free market economy in the late 1950s.

Political in a broad sense were also the practices of movie censorship in the U.S. that between 1930 and 1968 tried to harness the persuasive power of cinematic narratives to promote change for a healthier society. Variegated as they were, those practices, studied here by David Kirby, shared a "deficit" perspective and a distrust of spectators, which guided their attempts at regulating the production of meaning in texts. Mistakenly assuming that they could remove ambiguity and complexity from narratives, they failed because, as Kirby puts it, "interpretation is always a part of the movie-going experience" and "audiences need to decide for themselves what scientific narratives mean to them." At the opposite end of top-down censorship are the patient video activism and the knowledge-making through participatory media that emerged since the 1980s in connection with social justice movements. In her contribution, Kirsten Ostherr compares the visuals of the "Don't Google It" campaign, launched by the Belgian government in 2014 in response to concerns that patients were finding inaccurate and potentially harmful medical information online, to the new style of agency asserted by the patients and physicians who countered that the campaign expressed an outdated and condescending image of health consumers. As Ostherr explains, the philosophical underpinnings and aesthetic strategies of e-patient cinema date back to the anti-colonial outlook embodied in such movements as the Latin American "Third Cinema" of the 1960s, and constitute a direct challenge to deficit models of science communication. Finally, placing the very persistence of such models in a broader framework of intellectual history, Fernando Vidal argues that it manifests the continuity of aesthetic realism as a prevailing state of mind concerning the relationship between the cinema and science, as well as between film and history and literature. The aesthetics vary across domains, and so do the values of accuracy, authenticity, and fidelity that underlie the realist mimetic impulse directing the spectator's gaze.

The conviction to which the articles gathered here give concrete substance is that movies not so much exhibit as they enact, and thereby function as one of the most culturally significant contexts of science. While the cinema conveys to some extent contents that can be checked for their correctness as samples of expert information, its jointly epistemological, social and political significance lies in its capacity to fashion and perform questions and challenges about the scientific enterprise that lie beyond the criteria at work in the deficit model.[14]

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