

arship has already been done on the various motives behind popular science writing. The result, unfortunately, is that the three chapters on “Topics and themes in popular science” feel dry and dutiful, like a comprehensive but unenthusiastic literature review designed to assure Bowler’s fellow historians that he is familiar with the existing scholarship on the topic.

The author’s desire to get the less-interesting chapters out of the way early is understandable. But when the rest of the book is so rich, it seems a shame to begin

with the least original content. Readers who find themselves bogged down in the early chapters might abandon the book entirely and miss out on Bowler’s fascinating account of the varied genres of popular science and the stories of the men (and the handful of women) responsible for creating this material.

Structural difficulties aside, *Science for All* is carefully researched, lucidly argued, and extremely interesting. Not only a valuable contribution to historical scholarship, the book challenges readers to consider

whether the division between research and popular science writing is in fact an integral part of professionalized science—and whether this division must necessarily endure in the future.

References

1. S. W. Hawking, *A Brief History of Time: From the Big Bang to Black Holes* (Bantam, London, 1988).
2. A. S. Eddington, *The Nature of the Physical World* (Cambridge Univ. Press, Cambridge, 1928).
3. J. Jean, *The Mysterious Universe* (Cambridge Univ. Press, Cambridge, 1930).

10.1126/science.1183425

FILM

Science Goes Hollywood

Cat Bohannon,* Anthony DeCostanzo,* Tim Requarth,* Abba Dawesar, Annegret Falkner, Stuart Firestein,† Cynthia Jung, Anna North, Rachel Riederer, Kim Tingley, Greg Wayne

Under gently glittering chandeliers and taxidermy mounts of animal heads, a young, hip crowd of scientists and film buffs stood around sipping cocktails and conversing about learned matters. The Bell House, a performance space near New York City’s Gowanus Canal, is a common zone for such activities. What was unusual about this particular October evening was that the crowd specifically gathered to be inspired by science. They participated in a “Sketchy Science” drawing contest, competing for t-shirts and bar tabs for the best spontaneous depiction of the future of science. They then sat down together and watched a string of “Quirky Science Shorts”—short films that in some way made an art of representing science. Waiting for them at their seats were small slips of paper, on which they were asked to vote for their favorite film. Their choices would help determine which filmmaker received a cash award.

Is this the way that science finally becomes cool? Alongside events such as the World Science Fair and the TED conference, New York’s Imagine Science Film Festival (now in its second year) attracts bright young people under the auspices of merging science and art. The festival’s panel reviewed over 300 submissions to select four feature films and 46 shorts from nine countries for the two-week event. Screenings, panel discussions, and question-and-answer sessions were held in universities, art house cinemas, and bars scattered about Manhattan, Brooklyn, and Queens. In mid-

October, we set off in scientist-artist pairs to see whether the festival really did bridge the gap between science and art.

The festival included a sweeping range of genres. The offerings included a handful of traditional documentaries and biopics—for instance, a feature film loosely based on Eric Kandel’s autobiography *In Search of Memory*. The majority, however, were more experimental: a five-minute animation about the secret lives of magnetic fields, a quirky mini-documentary of a boy’s determination to save redheads from extinction, the story of a photon named Dave. These diverse works had been selected for how creatively they negotiated the boundaries between entertainment and information. The hope, of course, is that scientists will not be the only audience for something like the Imagine Science Film Festival. By making science entertaining, perhaps filmmakers can provide the general public greater access to scientific ideas.

Alexis Gambis—the festival’s founder and artistic director (who recently received a

Ph.D. in molecular biology and genetics)—wanted to ensure that the films were not only entertaining but also accurate in their representations of science. Not surprisingly, the most successful films were those that involved close collaboration between scientists and filmmakers. Harry Kloor and Dan St. Pierre’s animated feature *Quantum Quest*, which follows a photon from the Sun to the Cassini spacecraft, is one such film. The photon, Dave, finds himself on a mission to deliver an important artifact to Cassini in an effort to protect it from the evil forces of anti-matter, “the Void.” Although the plot and characters feel familiar, Dave’s story provides a creative device that links together a series of remarkable images acquired from actual NASA missions. (These whiz-bang images suggest it was no accident that public support for NASA surged after the release of the Hubble photographs.) The free screening was followed by a discussion with Kloor and retired NASA astronaut Daniel Barry. Many of the festival sessions included such postscreening conversations, which offered audiences access to some top researchers. With few tickets running more than \$10 (and many of them flat-out free), New Yorkers were given the opportunity to lift the veil between themselves and the lab by asking scientists questions.

Part teaching tool, part entertainment, *Quantum Quest* is neither contentious nor deeply philosophical, but it does use actual scientific data. Although, in comparison with other films at the festival, it runs short on specific findings, that is balanced by its commendable effort to make science fiction a little more accountable.

It’s a little more difficult to say how Kanji Nakajima’s *The Clone Returns Home* represents any current science. The festival’s most overtly sci-fi feature film tells the story of an astronaut named Kohei who, after he dies in space, is



Leonardo.

*These authors led the review. †To whom correspondence should be addressed: Department of Biological Sciences, Columbia University, New York, NY 10027, USA. E-mail: sjf24@columbia.edu

cloned—as a full-grown adult, with all his memories intact. The “cloning” process, which involves a machine that builds skin on top of muscle on top of bone, is rather far-fetched. The film, however, is less about the realities of human cloning than about the question of what it would mean to “copy” a person who has died. When he awakes, the copy of Kohei experiences psychological distress. He is tormented by an apparition of his former self, much as he was tormented, as a boy, by the death of his twin brother.

The film fell short of an accurate depiction of any current advances in cloning technology. Shockingly, at least for a film festival that claims to accurately represent science, the film even advances a profoundly anti-materialist message: that an exact physical copy of a human being may still be inauthentic or damaged in some way. According to the film, such copies lack a spiritual property that’s intrinsic only to the original being. Does this anti-materialism make the film anti-science? Its inclusion in the festival does raise the point that purely imaginative films can still stimulate discussion about real science—for example, the implications of cloning a dead pet or developing specialized clones for organ replacement.

Nick Rutter and Helen Cooper’s *Ginger*, a standout short in the festival, successfully conveyed serious scientific information while maintaining a playful storyline. Their simple film revolves around a young English boy who wants to understand why he has red hair, a condition that seems to infiltrate almost all aspects of his life. He begins to wonder whether redheaded people are going extinct, and this pondering soon leads him to the strange subtleties of genetics. Is the red-hair gene disappearing from the genome? Will it survive? Although not a scientist, the young man nonetheless searches for an answer as a scientist might. He seeks out and interviews molecular biologists and geneticists. These researchers don’t skimp on the technical facts, but the film never loses its levity. This blend of curiosity with technical detail was a wonderful reflection of how engaging science can be. Here, the process of science isn’t an arcane intellectual practice, but a type of problem-solving that we all can use when we want an answer. That point illustrates what is perhaps one of the larger issues at stake for the film festival: not how science and art differ but rather what they share in common.



The Clone Returns Home.

Competition for the festival’s three prizes was fierce. The jury comprised Gambis, science writer Carl Zimmer, and comic book writer Chris Claremont. The Audience Award went to *Leonardo*, by Jim Capobianco (who wrote the screenplay for *Ratatouille*). This 9.5-minute animated film approaches innovation and creativity through da Vinci’s dream of flight. Claire Bardet won the Scientist Award for *MEPE*, her 2007 video that features a strange private detective and the evolutionary patterns of the gene in mammals.

The *Nature* Scientific Merit Award (for the most scientifically accurate film) went to *Magnetic Movie*, directed by the self-described “semiconductor duo,” Ruth Jarman and Joe Gerhardt. The power of their short movie hinged on a single fact: that “magnetic fields are, by their nature, invisible.” During a residency at the Space Sciences Laboratory in Berkeley, the artists overlaid ordinary lab scenes with animations of magnetic fields inspired by the lab’s work on solar flares. The animations rendered the magnetic fields immediately tangible; they become turbulent ribbons of a massive unseen force swarming in a silent room. Static crackling, as if from a distant radio, accompanied the emerging fluxes of twists and loops. Rather than attempt to explicate electromagnetism, the film allowed the audience to simply experience it. In a sense, the animations provided a brief moment of artificial mastery: an approximation of the intuition a physicist might have when walking into a room and seeing chunks of metal. In other words, viewers got to feel, for a moment, like scientists.

The traditional means for putting an audience “in the shoes” of a scientist is the documentary biopic. Petra Seeger’s *In Search of*

Memory follows Nobel Laureate Eric Kandel’s trip in a well-explored trope in Holocaust narratives: victims return to the site of trauma and reencounter the landscape of their memories of the war. The film escapes predictability by using the trip to frame the larger story of Kandel’s research and advances in memory science. Even as his wife struggles to remember where, exactly, a secret tunnel near a French abbey was located, the film cuts to Kandel explaining how memories like these are encoded and per-

sist. Through this cross-cutting structure, we learn both about Kandel and the basic principles of his research.

In one of the film’s most striking moments, Kandel’s postdoc Harshad Vishwasrao watches a computer screen in the dark as fluorescent packages of RNA float down a neuron from the nucleus toward the synapse. These, he explains, trigger “budding” that will eventually grow new pre-synaptic terminals and thereby strengthen the connection between the cells—that is, the strength of a particular element of a memory. The image is inherently beautiful:

specks of green moving down a pale stem, and the subsequent growth like a phosphorescent vine twining around itself. As the image projects through Vishwasrao’s glasses, we realize we are seeing an unusual reflection of ourselves: we are this flesh, we are these brains, and we are not “housed” by them.

As Kandel says, “we are our memories.”

When the festival wound down and audiences scattered into cabs and local bars, it was hard to say how the general public was affected by what had taken place. Many members of the crowds were scientists or in some way already connected to the sciences. That said, the festival is still a young event. As it gains recognition in coming years, the diversity of the audience should grow. For its part, the Imagine Science Foundation will soon host a workshop for scientists and filmmakers wishing to collaborate on original projects. With any luck, we’ll see some of those projects at next year’s festival.

References and Notes

1. *Science* and AAAS were presenting sponsors of the festival.

10.1126/science.1184536

Imagine Science Film Festival

Alexis Gambis,
artistic director

New York.

15–25 October 2009.

www.imaginesciencefilms.com.