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More science, less fiction

By Yudhijit Bhattacharjee

By day, Leo Cheng is a NASA engineer who helps coordinate experiments onboard an unmanned spacecraft orbiting Saturn.

By night, he's fine-tuning a screenplay about two brothers in a Chinese American family — one of whom grows up to become a physicist while the other becomes a theater actor. Their relationship is strained when they fall in love with the same woman, and the physicist strives to show the woman that he too has an artistic side. "I wanted to humanize scientists through the story," Cheng said.

Cheng's writing effort is part of an experiment that Hollywood and the scientific community hope will lead to a more accurate portrayal of science in movies and on TV. Proponents aren't driven by the altruistic mission of increasing scientific literacy but by the belief that a realistic portrayal of science and scientists makes movies more compelling.

Launched by Martin Gundersen, a laser physicist at USC, with a grant from the Air Force Office of Scientific Research, the project's goal is admittedly an ambitious one. After all, the chasm between the worlds of science and

movies is sometimes as wide as that between fact and fantasy. But both sides believe that getting scientists interested in writing screenplays could be a worthwhile step toward bridging those worlds.

"I know getting scientists to write screenplays sounds radical," said Gundersen, who began the experiment with a two-day screenwriting workshop for scientists at the American Film Institute last year and is planning another one this summer. "But the world of science is full of people with terrific skills and intelligence. There have got to be some out there with the necessary imagination and writing ability."

Easier said than done, as Cheng found out when he received comments on the first 30 pages of his work from a screenplay reviewer in Hollywood. The science was solid, the reviewer wrote, but where was the story? The reviewer advised Cheng to delete several scenes in the script that served no purpose other than adding scientific realism and replace them with scenes that advanced the plot instead.

"He didn't hold anything back," Cheng recalled, still recovering from the thumbs-down nature of the critique. "But

it was fair criticism."

It didn't come as a shock, either. As one of the 14 physicists, biologists and engineers who attended the AFI workshop, Cheng knew screenwriting wasn't going to be easy.

Surrounded by pictures of legends such as Audrey Hepburn and Alfred Hitchcock, he and the other participants sat in the institute's library as they took in lectures from Hollywood professionals on topics ranging from the structure of screenplays to the marketing of scripts. They also learned the grim statistics of the business: A tiny fraction of scripts submitted to Hollywood get optioned, and a fourth of those lucky few get made into a movie.

The bar is slowly rising

The difficulty of dramatizing science is only one reason why good scientific content is rare in movies, according to AFI Vice Dean Joe Petricca, who supervised the workshop.

The culture of the filmmaking business — oft criticized as being more concerned about commercial success than artistic quality — is by and large unfriendly toward science, he said. "The typical attitude is, 'Why look for real science when we can make it up?'"

Even in cases where accurate science could be introduced without modifying the story line, there is resistance to do anything that goes against the supposed expectations of the audience. Chris Vogler, a former development executive at Fox 2000 and an instructor at the

workshop, recounted the making of "Volcano," which shows Los Angeles on the verge of being destroyed.

"I kept pointing out that lava makes bell-like sounds, but the studio would have none of it," he said. "They wanted it to roar like a freight train. Volcanologists probably thought the movie was a comedy."

That said, several movies in recent years have raised the bar for scientific realism in filmmaking and are likewise raising Hollywood's awareness about the need for quality scientific content, said Alex Singer, a workshop instructor and a veteran director of more than 200 television shows, including episodes of "Star Trek: Voyager."

Take Robert Zemeckis' "Contact," acclaimed for its nuanced portrayal of an astronomer who discovers a civilization 26 light years away, and Ron Howard's "A Beautiful Mind," which won praise from the scientific community for its sophisticated presentation of mathematics. The pair have not only achieved artistic success but have done well commercially.

The phenomenal popularity of Disney-Pixar's "Finding Nemo," an animation film about a clownfish journeying thousands of miles to find his lost son, can be attributed at least in part to its faithfulness to marine science and its realistic portrayal of the oceanic environment, Singer said. He also pointed to the successful use of science in lending depth to movies that don't involve a science-based plot: One example being the portrait of a surgeon

in Peter Weir's "Master and Commander," who is shown pursuing his interests as a naturalist in addition to treating wounded shipmates on a 19th century British vessel.

"When the bar is raised, it's bound to have an impact," Singer said. "After 'Saving Private Ryan,' for example, you can no longer do a stupid movie about Omaha Beach."

Increasing media coverage of advances in science and technology is fueling a demand for compelling entertainment based on plausible science, said Frank Spotnitz, one of the writers of "The X-Files" and an instructor for the workshop session on TV writing.

"But creating that kind of entertainment is a challenging task," he said.

The participants at the AFI workshop, chosen from among 60 applicants from around the country, came prepared with ideas to meet that challenge. Some — like Cheng's — emphasized the human side of scientists. Others ranged from science thrillers to science fiction.

One of them — by GlaxoSmithKline bioinformatics researcher James Brown — was about an American epidemiologist who is studying throat cancer in a subpopulation of Afghanistan and traces its origin to a U.S. bioweapons program. Another, by Houston environmental engineer Carl Carlsson, explored the life of the first child born to a human colony on the moon.

"These are compelling stories because,

ultimately, they are about people, not science," screenwriter George Walczak — an AFI graduate who recently wrote a screen adaptation of "An African in Greenland" — told the participants. "What you as scientist-screenwriters have to be able to do is preserve the drama without sacrificing the science."

That's the fundamental difficulty in writing good science-based screenplays, said Walczak, who called it the screenwriter's equivalent of an "engineering problem with multiple constraints."

For one, there's little time in a movie to bring the viewer up to speed on the relevant science. Then there's the problem of communicating abstract scientific concepts visually. And finally, even though everyday life in the lab is exciting for the passionate scientist, moments of scientific drama with universal appeal are few and far between.

As a solution, Walczak recommended following his "law of thermodynamics," which states that high stakes such as a life-or-death situation are necessary for a screenplay to be compelling.

Filmmaker Martha Coolidge, who used Gundersen's help to spruce up the science in "Real Genius," a 1985 comedy about college kids developing a high-powered laser, told the scientists that another obstacle they could expect to encounter was creating the shorthand for a given scientific development.

"If it took 10 years with 150 failures to invent the jet engine, how on Earth do I

show that in five minutes in a movie?" said Coolidge, a past president of the Directors Guild of America.

Although many studios hire scientists as consultants on projects involving science, the results vary depending on how receptive the crew is to the scientist's suggestions.

Adam Summers, a marine biologist at UC Irvine who consulted on "Finding Nemo," was struck by Pixar's willingness to make expensive changes for the sake of good science. "When a kelp biologist told them that putting kelp on a coral reef would be a terrible thing to do, they pulled hundreds of thousands of dollars' worth of art with kelp on it," Summers said. "They said, 'Yes, it makes a great visual, but there's no real story reason to do it and it's scientifically bankrupt, so we can't do it.' "

Summers said he had a diametrically opposite experience on the next film he consulted for; the results were so embarrassing that he won't reveal the name. To swell the ranks of scientifically minded professionals in Hollywood, the Alfred P. Sloan Foundation has been awarding annual prizes for science-based screenwriting and production at six film schools around the country. Started in 1998, the program has seen a steady increase in the number of students applying for the awards and has generated a "bank of very impressive screenplays," according to program director Doron Weber.

None has been made into a commercial movie.

"We see our effort as an investment in the next generation of filmmakers," Weber said. "In the coming years, when these students get top jobs at studios, they'll bring to the table an awareness of science and technology themes that is currently lacking in the industry."

To raise scientific awareness among established screenwriters and directors, Gundersen also plans to organize workshops where scientists will do most of the talking and filmmakers will do the listening.

"It'll be a lot harder to pull that off than getting scientists to try a hand at screenwriting," he admitted. In the meantime, Gundersen is at work creating a more extensive screenwriting workshop for scientists this summer. At the very least, he hopes that Cheng and other workshop graduates will develop second careers as science consultants.

"And if even one of them manages to write a successful screenplay," Gundersen said, "it'll be a giant leap for science in popular culture."