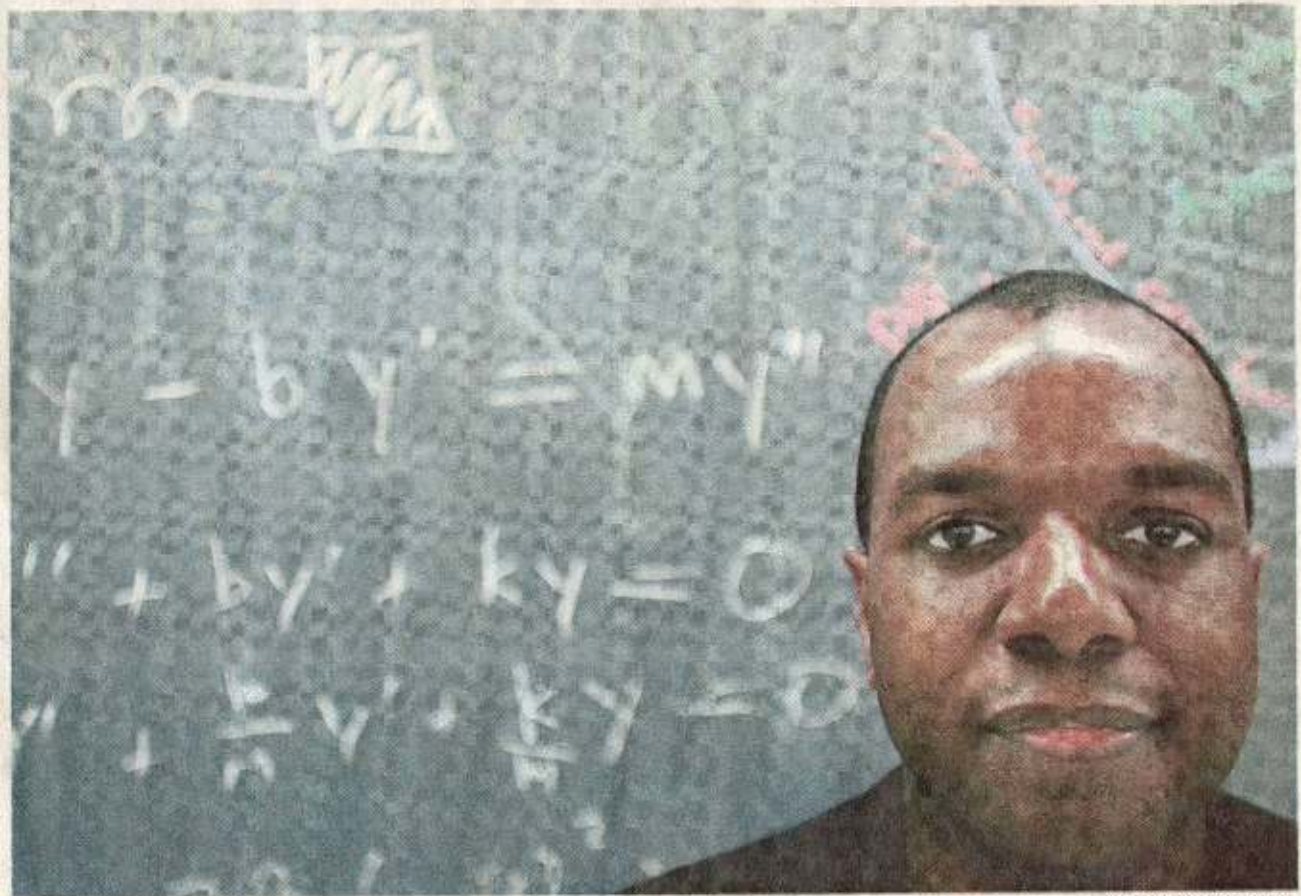


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GLOBE STAFF PHOTO/BILL GREENE

Divide and conquer

Harvard math professor helps
Hollywood get its science straight

By Vanessa E. Jones
GLOBE STAFF

"I've always loved movies — especially science fiction," says 35-year-old Jonathan Farley. As a kid, he watched the original series of "Star Trek" and "Battlestar Galactica" on TV and perused the futuristic novels of Isaac Asimov and Larry Niven. His memories of the '80s include sneaking into the computer-science lab at the State University of New York in Brockport, the town where this son of two university professors was raised. He and his friend Anthony Harkin would play a "Star Trek" game using the school's creaky 300-baud modem.

But it wasn't movies that Farley chose to focus his career on at the early age of 14. A vocation aptitude test told him he should study math. Now he's an award-winning, Harvard-educated mathematician about to wrap up a semester doing research in his alma mater's math department.

Three years ago, Farley came up with a way to dovetail his interests in pop culture and math. He started the business Hollywood Math and Science Film Consulting with Lizzie Burns, an artist in residence in the biochemistry department of England's prestigious University of Oxford, and Toronto businessman Lennox Farrell. (His friend Harkin, now a postdoctoral fellow in applied math at Harvard, occasionally pinch-hits with



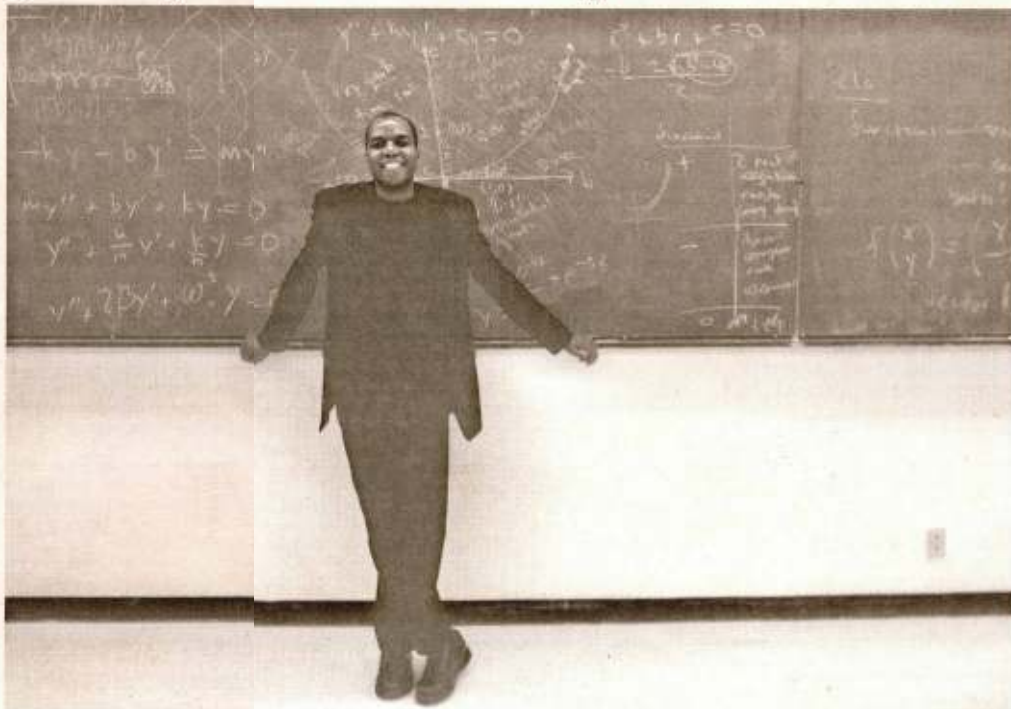
Improving Hollywood stories is just a fraction of his work

FARLEY
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The latter includes Farley and Burns's first consulting job in 2002 giving guidance to British screenwriter Ewan Kilgour on a film called "Square," which focused on a mathematician analyzing the human genome. In October, a busy Farley sent Harkin, at the request of the film's promoter, to talk about the physics of time travel at the Boston premiere of last year's indie time travel film "Primer." Earlier this year, Farley reviewed three scripts for CBS's hit Friday night math nerd/procedural cop show "Numb3rs" for accuracy and helped a "Numb3rs" researcher create a future episode by answering such questions as, "Is it possible to have only five pieces in a 1,000 piece puzzle, yet know what that entire puzzle is?" The show revolves around a math whiz (David Krumboltz) who helps his brother in the FBI (Rob Morrow) solve crimes.

The consulting work, Farley believes, is definitely there. He e-mails a list of movies, plays, and television shows that have incorporated math or science in some way in recent years. It includes "A Beautiful Mind," "Good Will Hunting," "21 Grams," "Pi," and a play that will soon be released as a movie, "Proof." But Farley is reasonable enough to know that math and science consulting may not generate three or four jobs a year, let alone one. So he's launched another consulting business, Phoenix Mathematical Systems Modeling Inc., that will explore ways to fight terrorism using his math specialty, lattice theory — a form of abstract algebra. Math could, for instance, help military officials figure out how many terrorists they would need to capture to disable a terrorism cell, Farley explains. His next job, a yearlong gig as a science fellow at Stanford University's Center for International Security and Cooperation, will allow him to delve more deeply into the subject.

Most math consultants used in Hollywood seem to get the job by chance. For "A Beautiful Mind," director Ron Howard found Dave Bayer, a Barnard College math



Mathematics professor Jonathan Farley in a Harvard classroom. In addition to his Hollywood work, he has created another consulting firm that explores ways his specialty — lattice theory — can be used to fight terrorism.

GLOBE STAFF PHOTO/BILL GRIENE

professor, after reading Bayer's theater review of "Proof" in the publication "Notices of the American Mathematical Society." The primary math consultant for "Numb3rs," Gary Lorden, chair of the math department at the California Institute of Technology in Pasadena, says he got the job while the show's creators were shooting scenes at Caltech last August and getting a feel for the math world by talking to him and other professors at the school.

Hollywood Math wants to take a more direct path to getting this work.

"The angle we've taken is try to get publicity for [the company]," says Burns, 30, who now uses the PhD in biochemistry that she received at Oxford to create artwork

that helps the general public understand science better. "It's very difficult to approach a film company. One of the main things is raising our profile to let people know that we're here. We're appealing to film writers and film producers to approach us."

How does Farley think pop culture portrays math and science? "Very badly," he says. And not because it makes economical sense for him to say that.

He talks about Hollywood's tendency to focus on the "outrageous mathematician" or put math professors in white clothing when, Farley says, "everyone knows that mathematicians dress in all black." As if to prove his point, on this particular day, Farley has indeed covered his tall,

lanky frame in a black suit jacket, black pants, black shoes, and black T-shirt. Farley recalls watching "21 Grams" and hearing Sean Penn's math professor character utter the linguistically incorrect phrase "mathematics are."

Then there's the 2002 James Bond film, "Die Another Day," which Burns points to as one of the scientific nadirs of pop culture. In one scene, an invisible car sneakily rolls up on the bad guys. "I think a lot of people [in the audience] kind of laughed at that," she says, because it was so unrealistic. Yes, the invisible car is based on modern technology, says Burns. But a car wouldn't be as invisible as the one shown in the film. You would see the car's rubber tires, she says. You would see

its nuts and bolts.

In addition to helping filmmakers save face, Burns also wants to aid audiences. "If people are being given completely the wrong science," says Burns, "how on earth at the end of the day are you to know what's possible and what isn't? It's down on some level to a matter of professionalism. If there was a film that's a period drama, then you would hope that the props and the dresses would be appropriate to that time. If you're going to involve science and try to explain it in a film such as the James Bond films, I think you should want to get it right."

The idea for Hollywood Math began to jell after "A Beautiful Mind" came out in 2001. Burns and Farley were fellows at Oxford,

and over coffee Farley mentioned to Burns that he thought the movie would spark a mini-trend of mathematician films. Then Farley, who was in the United Kingdom as a Fulbright Distinguished Scholar, wrote an essay about how math was portrayed in "A Beautiful Mind" for Britain's Guardian newspaper. He promptly received a call from screenwriter Kilgour, who asked for Farley's technical help.

The local movie publicity company, Allied Advertising, reached out to Farley for his next consulting job — the discussion Harkin led about the film "Primer" — but Farley decided to actively campaign to get work on "Numb3rs." He does have an agent, Caron Knauer, who's also an agent for one of his three brothers, Christopher, an editor at Time magazine. But Farley's initial contact with the producers of "Numb3rs" was in the form of persuasive e-mails sent after the show began airing in January. It just so happened that five episodes into the show's run, says consultant Lorden, the producers hired a researcher, Andy Black, who was expanding the show's crew of math advisers beyond Lorden and his Caltech peers.

By February, Farley was on a plane to the Los Angeles set of "Numb3rs" to watch scenes being shot for an episode about copycat train derailments. He met the show's creators, writers, and two of its stars, Morrow and Sabrina Lloyd, who also plays an FBI agent.

In his closet-size office in Harvard's Science Center, Farley pulls a thick stack of papers from a manila file — one of three scripts he and Harkin have read to make sure it contains correct mathematical jargon and depicts mathematical or scientific ideas in a clear and correct manner. Scribbled in red ink are some of the suggestions he's made. One back page is covered with dialogue that he suggested as a way to delve more deeply into one mathematical idea.

"I found that the TV writers don't like that," Farley says. "Because they think what they write is perfect."