

Life after Academia: How a Mathematician Found a New Career

Dana Mackenzie

Last year I wrote a series of articles for the Young Mathematicians' Network newsletter¹ that recounted how I tried—and failed—to obtain tenure at a small liberal arts college in Ohio. A number of readers have commented on how much they learned from my experience, and many begged for an epilogue: What happens to a mathematician after the tenure door slams shut?

"Whenever a door shuts, a window opens," goes a comforting adage, which I heard more than once during my tenure battle. For me the window has opened into a new career as a freelance mathematics and science writer. I will tell the story in two parts: how I found a life after academia, and how my career in writing was born.

Finding a Direction

When it was clear that I had my teaching job for only one more year, I started reading two or three books about career-search strategies. All of them stressed the importance of taking an "inventory" of my interests and skills in order to come up with a clear objective. However, I have never been very good at following advice, and most of the inventory techniques struck me as too gimmicky to be worth the trouble. It was more seductive to peruse the thousands of job listings on the World Wide Web, to post my résumé to the various online job services, and dream about finding the perfect job without even leaving home.

In fact, my online résumé did attract one job "nibble", which seemed like a sure thing in December, but then mysteriously slipped off the hook in February. By then over half a year had passed since I began my job search, and I still hadn't fin-

ished step one—figuring out what I really wanted to do.

It was time to gear up my job search in earnest, and I decided to try a different tack. Because somewhere around 95 percent of the jobs posted on the Internet are for computer experts, I figured that there would be jobs for the taking if I just added a master's degree in computer science to my mathematics Ph.D. I had already missed some deadlines, but still had time to apply to three universities in the southeast. I also managed to dig up my seventeen-year-old GRE scores, breathing a sigh of relief that the Educational Testing Service had kept them that long!

Meanwhile I kept my eyes open for other opportunities. In mid-March the Internet redeemed itself for leading me astray earlier. One day, on the Web site of the American Association for the Advancement of Science, I saw a link to "New Niches", a guide to nontraditional careers in science.² I clicked on the first of the "new niches", science writing, and found profiles of four graduate programs: Johns Hopkins, Boston University, New York University, and the University of California at Santa Cruz. True to form, I had already missed the deadline to apply to three of them. But the UCSC deadline was May 1—there was still hope.

Reading the Web page of the UCSC Science Communication Program³ was my "Eureka" moment. For years I had toyed with the idea of writing about mathematics. I had even contacted several popular writers of mathematics, including my idol Martin Gardner, to ask how they had gotten started. But the advice of the writers always seemed to boil down to this: Just start writing. While I was still

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¹See <http://www.math.usouthal.edu/~brick/ymn/archive.html>, issues 4.29–4.32.

²For anyone contemplating a nonacademic career I recommend going to this Web site right now. Start at <http://nextwave.org/> and follow the links.

³See <http://natsci.ucsc.edu/acad/scicom/SciWriting.html>.

on the tenure track, I had never mustered up enough gumption to do it. Now, it seemed, there was another way. You could learn how to write about science in the security of an academic classroom.

The moment of truth came in late April, when acceptances started coming in from the computer science grad schools. (Yes, thanks to those pre-historic GRE scores, all three of them accepted me.) Should I go for the M.S. in computer science and the likely prospect of an \$80,000 job in a couple of years? Or should I take a chance on the uncertainty of a career in science writing and earn \$25,000 if I was lucky? One of my e-mail correspondents wrote, “Think of what you wanted to do when you were a child, and try to make that happen.” That was easy. When I was a child, long before I ever knew there was such a thing as a mathematician or a computer scientist, I had wanted to be a writer. Fortunately my wife was willing to let me choose satisfaction over dollars, and she was excited about moving back to California. When John Wilkes, the director of the UCSC program, offered me the tenth and last slot in the class of 1997, my direction became clear. It was time to give the childhood dream a chance to come true.

Becoming a Writer

The Science Communication Program at UCSC lasts one year and leads to a certificate, not a degree—appropriately, in my opinion, because the practical experience one gains in the program outweighs any diploma. The academic part of the program is organized by genre: news writing in the fall, feature writing (the in-depth articles one typically sees in magazines) in the winter, and essay writing in the spring. All students are also required to complete two part-time internships during the school year and a full-time internship in the summer.

The students in my class formed a wondrously talented cross section of the sciences, with five biologists, a geologist, an environmental scientist, a physicist, and an engineer. Wilkes, who handpicks each year’s class, attempts to balance the specialties represented. Being a mathematician certainly helped me get in: I was the first Ph.D. in math ever to enter the program and probably the first ever to apply. The class was diverse in age as well, ranging from a twenty-two-year-old physics student who had just graduated from college to a geologist in his mid-fifties who had taken early retirement when his company disbanded its research division.

Before classes started I wondered if this program could possibly be as intense as graduate school in mathematics had been. I started getting my answer right away. For our first assignment the class reported on a lecture by an astronomer who had discovered eight new planets orbiting distant stars.

After the lecture we went straight to the newsroom of the Santa Cruz *Sentinel* (where our teacher was the city editor) and filed stories, just as if we had been regular reporters. We were not supposed to leave until we had finished, and the teacher did not want to wait around all night either. We were learning the first lesson of news writing: the importance of meeting deadlines.

I quickly realized that writing for a popular audience differs from academic writing in many ways. Not only does timeliness count, but so does brevity. Usually the writer has a fixed number of words or pages or column inches or minutes of air time, and if the story doesn’t fit, the writer has to chop it until it does. (Otherwise, the editor will.) Once, we were assigned to write an explanation of how something works in under a page. I interviewed a bronze sculptor and wrote an elegant one-page treatise on the process of lost-wax casting. I brought it proudly to the next class. Imagine my chagrin when the teacher told us our next assignment: “Now cut your description down to one sentence!” The moral was clear, if painful: journalists must be able to condense any subject into a nutshell.

Most of the students in the class, including me, had not come to UCSC with the intention of becoming newspaper writers. I struggled with the “AP news style” with its “inverted pyramid” format, in which the most important information in the story must come right at the outset, leaving all the explanation, qualification, and context for later. It violated all my training in mathematics, where you start out by making all your terms clear and gradually build up to the main result. But even if we hated it at times, the program broke us of our old writing habits. Our verbs sprang to life, and passive constructions were consigned to the dustbin. Our stories had people in them, and the people said things. Our stories *were* stories, or at least they had stories in them. As we moved into feature and essay writing, the restrictions on length and form eased, but the good writing habits remained.

Before I started at UCSC my idea was to be a mathematics writer, but in my courses and internships I found myself writing about all sorts of different things: distant planets, bronze casting, AIDS, archaeology,... In fact, I often found that it was easier for me to write about subjects that were not mathematical. When the subject was math, my writing would sink like a soufflé as soon as I started explaining technical niceties, such as what it means for a series to converge. My classmates—even though they were all scientists, most with doctorates—would begin to fidget when they got to those parts or skip over them entirely. If even highly educated readers did not have the patience to read about the convergence of an infinite series, how could I expect a general audience to? Slowly and painfully I realized I had to change my expectations. The goal of expository writing is not the same as

the goal of a textbook. I might not be able to teach the readers exactly what a convergent series is, but I could show them—in some imperfect way—how mathematicians think, who mathematicians are, or why mathematics has something to do with the world.

The internships may have been even more important than the classes in getting me to change my frame of reference from a mathematician's to a writer's. My winter internship, at the Salinas *Californian*, gave me the experience of "turning a story around" in a day and provided me with lots of "clips"—published articles, which to a writer are more important than a résumé. I learned also how newspapers get stories, often through press releases and news conferences. In the spring quarter I moved to the other side of the information conduit, the public information office at NASA-Ames Research Center. There I enjoyed being an "insider", knowing about things before the press does and influencing the way the press covers them. (I wrote part of a press kit on the upcoming Lunar Prospector mission, which the BBC will use as the basis for a documentary.) However, that internship also gave me a taste of the anonymity and frustration of working in a large bureaucracy.

This summer I interned for two months at *American Scientist* as a writer and editor. Editing, I learned, is not just a matter of correcting spelling errors and locating misplaced antecedents. Editors need a sense of good writing. They should understand the material but read it through the eyes of a reader who doesn't. They must have a sense of diplomacy and no ego—because the name that goes on the article is someone else's. Smart editors, like smart criminals, get what they want without leaving any evidence behind. Fortunately I worked with an author who not only tolerated but welcomed my suggestions, and we were both pleased with the outcome.⁴

What Next?

Generally speaking, science writers have three tracks open to them: freelance writing, a job with a periodical (or radio/TV), and a job as a public information officer. I have chosen freelancing, in some ways the most difficult of the three options but in other ways the most attractive. My biggest fear was that I would come home from my summer internship and simply find myself unemployed, lounging around the house in a T-shirt, drinking beer and watching TV. (And I don't even like beer!) But in the short time since I finished my summer internship, freelance writing has been just like a regular job—quite busy at times, not so busy at others—only with some huge advantages. My commute takes thirty seconds, not thirty min-

utes. I can work with my dog on my lap. And, yes, if I feel like it, I can take a break and watch TV.

To be successful, a freelance writer has to find a niche—a market or a subject he or she can return to over and over. In my first two months of freelancing, I have done almost all my writing for two publications: *Science* magazine and its Web-based cousin, *Science NOW*. I am greatly indebted to Barry Cipra, who blazed a trail into math writing before I did, for putting me in touch with his editor at *Science* and helping me get my first assignment. My association with *Science NOW* also came through a contact: the editor graduated from the UCSC program the year before me.

I still hope to do quite a bit of writing about mathematics; science editors profess to be eager for more math stories. Meanwhile, I am enjoying the chance to write about other disciplines as well. It is a big world out here, and there are lots of interesting things happening in it. A cartoon I saw tacked to a cubicle in the newsroom of the Salinas *Californian*, expressed the writer's life well. It showed two journalists with a blindfold, a handful of darts, and a bunch of subjects written on the opposite wall: Economy, Crime, International Relations,... One of the writers was saying to the other, "Let's see, what will I be an expert on today?" It's fun to be constantly learning something new, to escape the academic straightjacket of specialization, and not to take myself too seriously.

If You Want to Write

Do you have to change your career and lifestyle if you wish to popularize mathematics? Emphatically not. Some general-science periodicals, such as *American Scientist*, accept feature articles only from scientists and mathematicians, not from journalists. Some mathematicians—Keith Devlin and Frank Morgan come to mind—have taken the plunge of writing regular newspaper or magazine columns while retaining their academic positions. A writer with an academic position enjoys a huge advantage in prestige and credibility over a journalist. Even so, any academic who wants to write for a popular audience should first do a little reading about the "facts of life" in the publishing business. Check out William Zinsser's *On Writing Well* or Deborah Blum and Mary Knudson's *A Field Guide to Science Writing*. Be prepared (alas) to explain your subject without equations. Be willing to accept the fact that the editor might know better than you what the audience wants or is capable of understanding. Remember that things that seem obvious to you do not seem obvious to most readers. And finally, just do it!

⁴See "Inverse Boundary-Value Problems", by Margaret Cheney, in *American Scientist*, September/October 1997.