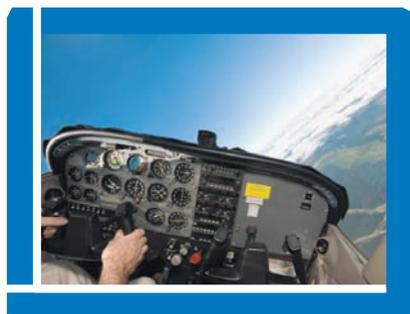
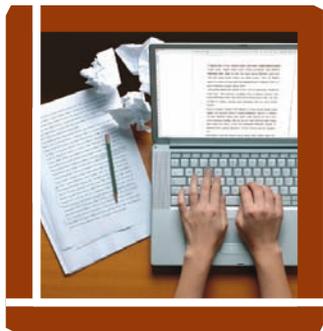


CAREER TRENDS

Careers Away from the Bench

Advice and Options for Scientists



Science Careers

From the journal *Science*



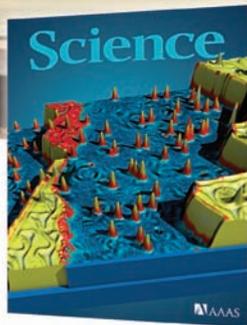
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15 MARCH 2009



Dear Readers:

A funny thing happened to me on the way to an academic career: I resigned a tenure-track position at a university, relocated, and got married! There was no faculty opening waiting for me at my new Zip Code. So I had to imagine/create/find a new career. What did I know how to do? Who might hire me? It was 1975, long before people openly discussed nontraditional careers. I found a research position here at the American Association for the

Advancement of Science (AAAS), thanks to an advertisement in a local newspaper. I was hired, in spite of concerns that I was “overqualified.” It is ironic that the people who analyze data on doctoral scientists would have classified me as “underemployed.”

That job led me to undertake research trying to understand factors that shape the demographics of the talent pool for science, engineering, and biomedicine. And thus, I began a totally new career pathway.

Fortunately, today, people are much more willing to discuss nontraditional careers. More accurately, there has been a growing realization that so-called “alternative careers” are indeed quite the norm.

We learn a lot more during our graduate education than how to conduct research in our areas of specialty – how to think critically, how to ask questions and find answers, how to communicate. And those skills are valuable and valued beyond the bench. It is our hope that you find the essays in this booklet useful as you set out on your own journey, wherever it might take you.

Shirley M. Malcom, Ph.D.
Director, AAAS Education and Human Resources
Chair, AAAS Center on Careers in Science and Technology



CREATIVE JOB SEARCHING: MORE THAN SENDING OUT YOUR RESUME

BY BRIANNA BLASER
MARCH 15, 2009

Upon entering graduate school, many assume that with the knowledge and experience they gain from completing a Ph.D.—and possibly one or more postdocs—will provide ample career opportunities when they graduate. Needless to say, this is not always the case. There are many factors at play here: a scarcity of academic jobs, an inability to speak the same language as industry, apparent surplus of Ph.D.s, issues when transitioning to a career away from the bench, and general fluctuations in the economy. Given the way that such factors may limit job opportunities, it's important to be creative and innovative in your job search. This is especially true for those looking to find employment outside of traditional research careers in industry or academia.

What can you do to improve your chances in the job market and to have a positive experience with your job search? Several things can help. First, and most important, you'll need to expand your network and leverage your current contacts. You should see the job search as an opportunity to market yourself and your abilities, remain open-minded and cast your net broadly, and seek out professional experiences away from the lab.

Network, Network, Network

First the bad news: some of the most obvious and perhaps easiest ways of looking for a job, including applying for jobs online and through ads in journals, are some of the least effective for finding employment. Richard Nelson Bolles, author of the ever-popular job search manual *What Color Is Your Parachute?*, estimates that these methods offer a 4–24 percent chance of finding a job. This clearly suggests that you need to do something more to improve your chances. The good news? Bolles also offers suggestions of better ways to job hunt. These range from asking for leads from people in your network, to calling or showing up at potential employers, or seeking out contacts within specific organizations. Notice one common thread: networking.

Bolles is not the only person to make this suggestion. Many recruiters and job-hunting experts agree that when you're looking for a job, networking is critical. Although networking can be intimidating and may seem insincere, it's an invaluable skill that will continue to prove useful throughout your career. Try to remember that networking is not about “schmoozing,” but about building relationships. Making contacts now and becoming more comfortable with networking will help you start your career off on the right foot.

Try to remember that networking is
not about “schmoozing,” but about
building relationships.

Begin by leveraging contacts in your current network. Remember that this includes your past and present bosses, coworkers, current and former classmates and teachers, as well as friends and family. Take time to reach out to these people and tell them that you're currently looking for a job. You only need to mention the general field you're interested in and ask them to put you in touch with anyone who might be able to help. Although they might not be able to help you, they may refer you to others who can assist in your job search.

After talking to your current contacts, it's time to make new ones. By building new relationships, you can get to know people in fields that are of interest to you who might be able to help you find employment. Be strategic. Look for organizations related to your interests and attend their events or make use of their directories. Likewise, a professionally oriented online social networking site such as LinkedIn can help you expand your network. On campus or at conferences, go to receptions and seminars related to the field you'd like to work in and talk to as many people there as possible; tell them about your interests and learn more about their experiences. Contact your campus career center (or the career center at your alma mater) about any programs they may have to connect with other alums. There are a myriad of ways to meet people, but being deliberate can help to make it more productive.

As you're meeting new people, try to set up informational interviews. An informational interview is just that, an interview where you seek out information from the person that you're talking with. In the case of job searching, you'll want to sit down with individuals and learn more about the work that they do and ways to break into their field. In particular, ask questions about what sort of experience or skills you'll need to secure a job. These meetings can be short—15–30 minutes should be enough time. You'll find that people are often willing to meet with you because they like to help others. Research the person beforehand and develop a list of questions that you want to ask. Make sure to ask them for the names of other people that you might want to talk to. You should never, however, explicitly ask them for a job. They know that you are looking and will likely offer to help in whatever way they can.

Think of Your Job Search as Marketing Yourself

You may be tempted to think of your resume and cover letter as documents that are lists of accomplishments. In reality, they are more than this: they are marketing materials. What does this mean? First of all, they should be designed to draw the employer in. Your resume and cover letter need not detail every accomplishment in your life, but should be designed to get you an interview. Make the effort to tailor your cover letter and resume to highlight accomplishments related to the specific job you're applying for. It will be time well spent. Finally, remember to have others read your materials to ensure that they're clean and error-free, as any good marketing materials should be. Spelling and grammar errors in resumes and CVs are often a big turnoff for employers.

Remain Open-Minded and Cast Your Net Widely

When you're looking for a job, consider any and all opportunities. As you network, you may hear about job openings or training programs that you wouldn't have known about otherwise. Being open to these sorts of options may lead to interesting career options. Similarly, remember that you're looking for opportunities and possibilities that interest *you* rather than what you feel you *should* be doing given your background or what your adviser or boss thinks you should do. It's your career, so your opinion is most important.

In remaining open minded, consider ways you might compromise in your job search. Your first job need not be perfect. You might consider employment in a different location or in a slightly different field. Given how often people switch jobs today, you aren't necessarily locked into your first career decision. The most important thing should be finding a job that will lead to your next opportunity. As such, carefully consider any offers that you do get. You don't need to take the first job that is offered simply because you feel lucky to get an offer. Make sure that it is the job you want and that you're comfortable with any compromises that you're making.

Gain Experience

When transitioning to a new field or industry, having experience can give you a leg up in the application process. In a *Science* Careers article, “Taken for Granted: Fitting the Job Market to a T,” one potential employer of postdocs for nontraditional positions discussed why she ended a recent search without hiring anyone. She felt the postdocs had trouble thinking “outside the box of their lab bench” and lacked skills necessary for a career away from research. Seeking experience away from the bench can help ensure that employers aren’t left with that same impression of you. It also helps to expand your network.

Depending upon the sort of career that you’re interested in, there are various ways to gain experience. In the policy arena there are several fellowships, such as the AAAS Science & Technology Policy Fellowships, that are designed to give scientists experience in government and insight into how policy decisions are made. Scientists interested in writing can gain experience by volunteering to write for a campus publication, professional organization newsletter, or local newspaper. If you’re interested in other fields, find volunteer work or related internships to show that you are interested in broadening your horizons. You might volunteer in student government or your campus postdoc association, or seek committee work elsewhere on campus. This can be particularly beneficial if you find experiences related to your career aspirations. You can also look for internships with local companies or organizations that do work relevant to your interests.

Using these tactics, your job search, regardless of barriers you might face, will go more smoothly. It’s always a good idea to make use of your network and think critically about your goals and strategies. These strategies may take more effort on your part than just submitting applications online; indeed, you may find job-hunting is a job in and of itself. But you’ll likely learn more about potential career paths and find a job more quickly.

Finally, remember to stay positive throughout the process. If you’re negative about the job search process, your experiences in academia, or your coworkers, it’ll make you less appealing. No one ever said that a job search was easy, but if you keep positive and are strategic, it will make the process more enjoyable.

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GOODBYE TO ALL THAT

BY PATRICIA GOSLING, BART NOORDAM
FIRST PUBLISHED ON MARCH 28, 2008

Let's say you've mapped out your potential career options, have explored various opportunities, and have decided that a career as a researcher, either within or outside academia, isn't for you. Leaving the lab may not be easy, but when you've decided to say goodbye to the bench, rest assured that plenty of opportunities await.

Here, we focus on some of the issues you'll face in finding jobs outside the lab and in becoming part of a new work culture, whether it's in a company, a consulting firm, a nonprofit organization, or the public sector.

The Big Decision

Saying goodbye to lab work can be a scary prospect. After all, you've been working in a lab for years, and you may wonder if you're even qualified to do anything else. Then there's the emotional fallout. It will be hard to announce that you're walking away from research to do something unrelated or only loosely related to your field. And it may be hard to ignore the voice in your head that keeps you awake at night: Have all those years spent synthesizing chiral compounds or isolating DNA added up to nothing?

Silence the voice in your head by reminding yourself of the numerous, rewarding careers you have the freedom to pursue now that you've decided to leave the lab. These jobs need your expertise and may even make use of the skills you learned at the lab bench.

Landing a Job

As you look beyond the lab-work horizon, take your time and, if necessary, talk to a career counselor to help you narrow the dizzying number of options you can pursue. When you've identified the type of job you want, you need to focus on the skills that make you an attractive candidate.

When drafting your curriculum vitae (CV) or presenting yourself in an interview, be sure to focus on the skills that are relevant for the job. If you're going into finance, for example, highlight your excellent analytical and computer-programming skills. If you're applying for a nonresearch position in the pharmaceutical industry, shine the spotlight on your time-management and project-management skills. It may help to put yourself in the employer's shoes and imagine what you would look for if the situation were reversed. In brief:

- Focus on your transferable skills and traits (oral and written communication, time and project management, teaching and mentoring, analytical thinking, problem-solving, flexibility, and dedication).

- Highlight your willingness to learn and the fact that you're a self-starter. Give some examples of your ability to be a good team player.

- Downplay the specifics of your thesis—they won't be relevant in a job outside the lab. Instead, focus on the general aspects: how writing a thesis demonstrates your ability to complete a large, self-directed project. Also, focus on career goals and the contribution you can make to the hiring organization.

- Talk about leaving the lab as a positive rather than a negative experience. Don't say, for example, "Well, I would rather have gone into academia, but there aren't enough jobs, so here I am." Instead, say something such as, "I enjoyed doing research, but now I'm seeking a new challenge that will allow me to use the many skills I mastered as a graduate student."

Be sure to thoroughly research the organization you're applying to and consider professional help to draft your CV (or resume, as short-form CVs are called in the United States). The format of your CV will certainly be different if you were previously pursuing a position in academia—and formats vary by field, industry, and country. At the very least, ask a trusted friend or colleague who works outside academia to review it.

Moving from the lab to an office environment can feel very much like moving to a foreign country.

Culture Shock

You've landed a job you're excited about. Congratulations! But be prepared for culture shock: Moving from the lab to an office environment can feel very much like moving to a foreign country. In the lab, you most likely were the master of your domain—or, at least, of your lab bench. It's likely that your passion and scientific curiosity provided the drive to produce. Although you had to report your progress to your supervisor, you were probably left alone most of the time to get on with your work. And there was a specific reward at the end: your Ph.D.

In a nonacademic setting such as a private company, you will be confronted with very different expectations. Although it may have been okay to be a maverick in the lab, corporate culture often thrives on a spirit of team building and adhering to specific corporate values. Everything from how you act to the hours you work to how you dress may be a radical turnaround from what you're used to. You may be working under a strict chain of command in which you report to one or more superiors, whose own performance may be judged on how well you perform.

After years of freedom to move around different workstations in the lab and to come and go as you please, you may find yourself sitting at a desk and staring at a computer screen for most, if not all, of your day. This will be a change of pace, too, and you may have to find ways to adjust, such as taking breaks to walk around and get some fresh air.

On the professional front, be prepared to accept the reality that projects, workloads, and timelines are often very “top down.” Important decisions are made higher up, and you, the worker, are expected to carry them out. You may be asked to stop working on a project you find enjoyable when management deems it no longer profitable. You may find yourself needing to learn one or several new skills, and you'll probably spend a lot of time in meetings.

Settling In

As you settle in to your job, take your cue from your colleagues. You may have been at the top of your game when you were awarded your Ph.D., but you'll be the new kid on the block, so it's best to listen and learn from the people around you. Develop your skills as a team player and be cautious and diplomatic when suggesting new ideas. No one likes a pushy know-it-all. Keep in mind that the bottom line, not employee satisfaction or innovation, will drive most of your company's decisions. In the academy, free expression is usually encouraged, even to the point of rudeness. Be aware that diplomacy and polite conversation may be the norm in your new workplace, so be prepared to follow suit.

Show your flexibility by volunteering for projects others may not want to do. You will gain insight into the full scope of your new position and develop strengths you might not know you have.

Finally, take full advantage of any perks, such as your company's professional development program.

Sign up for courses and additional training in areas you may be weak in. Learn a new language, new computer skills, meeting skills, or better ways to manage your time. In no time at all, the skills you learned in the lab will be transformed into practical assets you'll take with you as you move through the working world. And wherever your career takes you, remember that planning and communication are essential for success in any field.

What you end up doing may have only a faint relevance to your Ph.D. work, if any, so embrace the upsides of your new job and downplay the negatives. Everybody needs time to adjust. New opportunities offer new and unexpected rewards. Learning to survive and thrive when you are pulled out of your comfort zone is an experience that will benefit you for the rest of your life. So, set sail for far horizons and be fearless about the unknown world ahead.

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SCIENTIST LAWYERS: TEST TUBES TO BRIEFS

BY LAURA BONETTA

FIRST PUBLISHED ON FEBRUARY 22, 2008

To BE SUCCESSFUL in this position candidate must be a strong communicator and have an interest in intellectual property law. Candidate will participate in patent law course and will be required to pass the United States Patent Agent Bar Exam by a predetermined time.

Increasingly job ads like the one above are targeting scientists in a broad range of fields, especially engineering, chemistry, and biotechnology. From newly minted Ph.D.s to established faculty, scientists are joining the ranks of patent agents, patent examiners, and technology transfer specialists—all careers that do not require law degrees. Those willing to go back to school to study law will have access to a wider range of opportunities, not to mention higher salaries. What these individuals bring to their jobs are strong analytical skills and an understanding of complex technologies and their applications.

In the United States, scientists can join law firms fresh out of graduate school. Then, while helping with patent applications and other tasks, they typically prepare to pass an exam by the US Patent and Trademark Office (USPTO), which allows them to become patent agents.

James Dilmore went this route six years ago, when he joined the Pittsburgh-based international law firm Reed Smith. “I had found scientific research exciting but also very frustrating,” says Dilmore, who obtained his Ph.D. in neuroscience. “I also wanted a position with a bit more stability than a series of postdocs.”

By chance, the wife of one of his thesis committee members was getting ready to leave her post at a local law firm. She introduced Dilmore to her boss. “I did not have aspirations to go into law, but the job appealed to me,” says Dilmore. He started as a technical adviser at Reed Smith in February 2001 and passed the patent exam in April 2002.

As a patent agent, Dilmore is responsible for filing patent applications on behalf of several clients. He also spends a good part of his workday advising attorneys at Reed Smith involved in litigation cases. “One of the roles I see myself filling is to ensure that lawyers do not press scientific arguments so far that the science is no longer accurate,” says Dilmore. “I can recognize scientific weaknesses on either side of the argument.”

And as litigations often require the testimony of renowned scientists as expert witnesses, Dilmore is often asked to act as “translator.” “It is part of my job to explain to scientists what is important legally,” he explains. “On the other side, I help the attorneys understand what is going on with the science.”

Second Degree

While it is possible to remain a patent agent, or even a technology specialist, within a law firm, a law degree is needed for career advancement. In the United States doing things like filing appeals from the USPTO to courts, negotiating licenses to use patented technology, or suing those who breach contracts requires a law degree.

Patricia Granahan started working toward a Juris Doctor (J.D.) degree right after completing her Sc.D. at the Harvard School of Public Health. “From the time I was in high school, I knew I wanted to combine an advanced degree in science with a law or business degree,” she recalls. “I didn’t necessarily know what I’d do with the combination.”

The timing turned out to be perfect. In 1980, while Granahan was in law school, Ananda Chakrabarty was awarded a US patent for genetically engineered *Pseudomonas* he created while working for General Electric Company. The landmark case, which allowed for the first time the patenting of a living organism, paved the way for a flurry of biotechnology patents.

Granahan, who was initially hired as a part-time scientific consultant by a firm in the Boston area, soon had “more work in biotechnology patents than I could do,” she recalls. Indeed the field of biotechnology patent law quickly grew, along with the demand for lawyers with advanced degrees in biology and medicine.

Granahan stayed with the same firm for 16 years, moving up the ranks while raising her two children. After working as an in-house lawyer at the newly established Whitehead Institute for Biomedical Research and as a partner in a Boston firm, in 2006 Granahan joined Wolf, Greenfield & Sacks, PC, where she is currently a shareholder.

Twenty-five years after starting her career in patent law, she still really enjoys what she does. “The biotech aspect of patent law has changed tremendously since I started in practice and the rules of practice have changed just as significantly. We have to keep up with changes in both the science and the law,” she says. “This is a career that gives you a chance to really thrive. It’s not a practice where you’ll ever be able to say, ‘Now I know everything.’”

“One of the roles I see myself filling is
to ensure that lawyers do not press
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science is no longer accurate.”

Balancing School and Work

Unlike Granahan, Karen Brown obtained her law degree on the job. After completing a postdoc at the US National Institutes of Health (NIH) in the field of cell biology, Brown decided to test the waters as a patent examiner with the USPTO in Alexandria, Virginia. “I thought that if I liked it at the USPTO, it would give me an entry into patent law. If I hated it, I could go back to the bench,” she recalls.

But she liked it, and three years later she started applying to law firms. One of the things she was looking for was a firm with a patent agent program in place, where the firm would pay for employees to attend law school.

In April 1998, she moved to Fish & Neave in New York City and started law school the same year, graduating four years later. “I worked all day and went to school at night,” she explains. “It was brutal. I was feeling that I was behind in every aspect of my life.”

After working as an associate at Fish & Neave and then in-house at a large pharmaceutical company, three years ago Brown got a position as an in-house attorney with the biotech company Vertex Pharmaceuticals in Cambridge, Massachusetts. “At the firm I was dealing with a wide variety of technologies. Now my focus is narrower but I am involved more deeply,” she explains. “With every patent application, I have to consider how it fits into the intellectual property strategy of the company.”

Another difference is that she does not have to worry about billing a certain number of hours each week, the typical way law firms keep track of their lawyers’ accomplishments. “With two young children I did not want to be billing 60 hours a week,” says Brown. “There are times when I take work home or work on weekends, but I try hard not to do that.”

Wide Range of Opportunities

Erich Veitenheimer also used the USPTO as a stepping-stone to a career in patent law. A senior corn breeder with DeKalb Genetics International, he was alerted by a colleague to an ad for a job with the USPTO for a patent examiner with knowledge of plant biotechnology. “It sounded fascinating,” says Veitenheimer, who was offered the job during his initial phone call inquiring about the post.

After being at the USPTO for two years Veitenheimer started attending Georgetown University Law Center in the evenings, with the USPTO helping to pay the tuition fees. “It was a tremendously long day but the stimulation was worth it,” he says. “Walking into my classes I felt my brain cells tingling.”

When two years later the USPTO changed its policy and reduced the amount it would pay for its examiners to attend law school, Veitenheimer became a patent agent with a mid-size patent firm in Virginia willing to support his studies. He subsequently moved to a smaller firm and then a large international firm, where he progressed all the way to partner. In 2005, he became a partner in the Washington, D.C., office of Cooley Godward Kronish, LLP, a national technology firm that serves primarily small to mid-size biotech companies.

Veitenheimer says patent law allows scientists to stay close to the science on topics ranging from stem cells, to cancer and HIV drugs, to RNA interference. “The range of topics is tremendous,” says Veitenheimer. “You get to know the work intimately.”

And the opportunities go beyond patent law. “About half of our lawyers do pro bono work, but not in intellectual property law,” says Veitenheimer. “They come back to the firm after being in front of a judge in, for example, an immigration case and they are very excited and energized.”

Finding a Job in Patent Law

Although scientists are in high demand in law firms, the competition for a job is stiff. An ad typically gets 100 to 200 applications. For applicants to stand out, it is important that they have not only good scientific credentials, but also a demonstrated interest in intellectual property.

Scientists who have become patent agents and lawyers advise postdocs and students interested in a career in patent law to take a look at some patent applications; these are freely downloadable from patent office websites. In addition, they should take advantage of courses in intellectual property law being offered at many universities. Some technology transfer offices at universities also offer internships or volunteer work. Finally, many major cities have an intellectual property association that provides opportunities for networking.

Patent Law in Europe

Scientists are also in high demand in law firms outside the United States. While working toward a Ph.D. at Warwick University in the UK, Philip Webber attended a course meant to teach chemical patent attorneys about biotechnology. “I did not know anything about patent law at that time. It was purely fortuitous that my university was running these kinds of courses and that I attended one of them,” he recalls.

The course sparked an interest in the subject. Webber, who had already decided he did not want to continue with bench research, started sending out applications to several law firms. He was hired by the London-based Frank B. Dehn & Co. in the spring of 1992.

A year after joining his firm, Webber passed a set of exams, called “foundation papers,” which test understanding of basic concepts such as patents, trademarks, and copyright. He then passed two additional sets of longer and more challenging exams that qualified him to practice patent law within the British and European patent offices.

However, because UK patent attorneys, unlike their American counterparts, do not have law degrees, they have limited rights to go in front of a judge to handle, for example, patent litigation. Such cases are generally handled by solicitors and barristers, who are less likely to have formal scientific training. British intellectual property solicitors typically practice in all areas of technology with biotech being only a small portion of it.

Regardless of the country of practice, a career in patent law requires good analytical and communication skills. “The ability to write clearly and concisely is paramount,” says Webber. “Often we give job applicants a test where they are given something simple like a desk staple remover and told to describe it in everyday language.”

Another important skill is to keep all the balls in the air at the same time. “At any one time I have 50 or so patent applications going through the exam process. A lot of the deadlines are set in stone. And I am bombarded with e-mails from clients all the time,” says Webber. “You have to be a very organized person and to be able to constantly reprioritize.”

Good people skills are also helpful as patent agents and attorneys deal with a variety of people on a daily basis, from scientists to business executives, and patent examiners to other lawyers.

Related Careers

Patent law is not the only career available to scientists interested in intellectual property issues. Some scientists land jobs at the patent office and review patent applications for a living. Others find satisfying careers as technology transfer officers at universities or research institutes. Sean Lee joined the tech transfer office at Boston University after having worked at two startup companies. “There is so much going on in technology transfer,” says Lee. “For me it was like a kid walking into a candy store.”

Lee is the first point of contact for physical scientists who have made a discovery that may have commercial value. “In technology transfer you need to look at the world a bit differently than when you are doing research,” says Lee. “You don’t want to ask what is most interesting, but rather who really cares about this and is going to pay for it.”

Lee’s experience is not unlike that of Lisa Finkelstein, who joined the technology transfer office at the National Cancer Institute (NCI) of NIH in September 2005. She acts as a conduit for scientists at several NCI labs to assist with submitting internal paperwork on inventions. “Anyone at NCI can contact our office for guidance and advice on potentially patentable new discoveries,” she says. She also drafts material transfer and collaboration agreements for the labs on her docket.

Some of her colleagues moved on to technology transfer offices in universities or were hired by pharmaceutical companies or law firms. “Once you get the training here, you are pretty much set for wherever you want to go,” she says. “There are a lot of options.”

Regardless of the path they take, scientists who have pursued intellectual property law as a career say it nourishes their love for science. “It is a great fit for people who enjoy science and want to have the ability to read about it, talk about it, and be involved in it, but without actually doing it,” says Finkelstein.

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STEERING SCIENCE FROM A HIGH ALTITUDE

BY SIRI CARPENTER

FIRST PUBLISHED ON SEPTEMBER 19, 2008

It's a given that peer reviewers influence research-funding decisions. But behind the scenes, another group of scientists holds considerable sway over what research gets funded and what does not: scientific program officers. Sometimes called program managers or scientific officers, "they're catalysts who play a key role in the scientific leadership in their fields," says Norka Ruiz Bravo, deputy director for extramural research at the US National Institutes of Health (NIH) in Bethesda, Maryland.

Funding agencies and organizations have a cadre of program officers whose most pressing responsibility is to oversee peer review for a portfolio of grants. For example, program officers at the National Science Foundation (NSF) handle about 100 proposals a year. The work involves planning program initiatives, issuing calls for proposals, advising researchers, reading proposals, picking reviewers, running review panels, organizing reviews by mail, synthesizing reviewers' evaluations, and making funding recommendations to a division director who usually has final say over funding decisions.

In addition to portfolio management, program officers keep an eye out for new opportunities and facilitate connections among researchers. “The best program officers survey their disciplines and ask, ‘What does the field need from me?’” says Irene Eckstrand, a program director at the National Institute of General Medical Sciences, part of NIH. “It may be that the field just needs money, or it may need a symposium to move it along, or it may need deeper collaborations within the field. To make that happen, you bring the scientists together and give them opportunities to talk.”

Another way program officers exert influence is by guiding discussions during panel reviews, says Katharine Covert, a program director in NSF’s Division of Chemistry. She says she asks a lot of questions during review meetings to stimulate productive conversation. But, she says, “I try very hard to not put my own opinion of a proposal out there. It’s very easy to bias a group.”

Program officers must also make tough judgment calls about proposals that receive mixed reviews, or when—as is often the case—there are far more high-scoring proposals than there is money to fund them. Program officers can also override reviewers, recommending that lower ranked proposals get funded, for example, to support new investigators or encourage high-risk but potentially transformative research. “It’s really tricky business, because the community could rise up against you,” observes a former NSF director, Neal Lane, who is now a physicist at Rice University in Houston, Texas.

Program officer positions in the federal government usually require a Ph.D. and at least six to 10 years of experience in independent research.

Learning the Job

Because program officers have so much latitude in decision making, Lane says, “the job really can’t be done by someone who doesn’t understand the science or the engineering that he or she is going to be overseeing.” Program officer positions in the federal government usually require a Ph.D. and at least six to 10 years of experience in independent research. Formal training for new program officers covers a wide range of rules and procedures designed to ensure fairness and consistency, including instruction on federal ethics laws, meeting facilitation, and specialized software used for handling grants.

For many program officers, being a steward of taxpayer money is something new. “It takes a while to get used to people coming to you as an authority and as the person who holds the purse strings,” says Paul Hertz, chief scientist in the Science Mission Directorate at NASA. Making a smooth transition, he says, demands not only solid scientific credentials but also strong administrative skills. “You need to work well with the people in your field, because you are now the face of the agency,” Hertz says. “You need to be a good communicator. You need to be decisive and willing to make hard decisions. If you’re the kind of person who wants to make everybody happy, you’re probably not going to enjoy your job, since only about one out of three or four proposals gets accepted.”

Working in a large government bureaucracy also means giving up some freedom. “You have to be very careful about what you say because you speak for the government,” says Eckstrand. “There’s nothing that you say, even cocktail chatter, that isn’t on the record. And there are times where, as an agent of the government, you have to implement policy that you don’t agree with. I know people who have left government because they couldn’t administer policy in a way that was consistent with their principles.”

Whether in federal government or at a private foundation, being a good program officer also takes organization and versatility. Brian Quinn, a program officer in the Robert Wood Johnson Foundation’s Research and Evaluation group, says that in a given month he puts his hands on 30 or 40 different grants. “When the phone rings, you’ve got to be able to shift gears quickly,” he says.

For program officers in federal agencies, planning around an uncertain federal budget is also a perennial challenge. “I have to get solicitations out for next year, but we don’t know what the budget for next year is going to be,” says Covert.

A False Economy

Some science policy experts argue that program officers have been hampered by ever-increasing workloads and recent administrative budget cuts. In a report released in mid 2008, a blue-ribbon panel appointed by the American Academy of Arts and Sciences wrote, “It is false economy to deny program officers who manage millions of taxpayer dollars the resources necessary to engage fully with the professional communities they fund and for whom they are responsible.”

“Increasingly, program officers feel there are constraints on what they can do,” says Lane, who served on the panel. “The program officers’ commitment hasn’t changed, but doing the job well has been made more difficult. My worry is that unless we reverse the trend, it will be harder to find program officers in the future.”

He adds that dwindling coffers have restricted program officers’ ability to attend scientific conferences and visit universities and even to devote time to reading literature that allows them to keep up-to-date in their fields. All of this has undermined some program officers’ confidence, he says, making them more reluctant to take fliers on high-risk, high-reward proposals.

As evidence of the effects of how program officers are stretched too thin, Howard Hughes Medical Institute President Thomas Cech, who chaired the American Academy panel, notes that discretionary funds set aside for program officers to allocate to promising projects at critical junctures went mostly unspent at NSF last year. “Those are the moments when the right program officer should be able to find that money within days and say, ‘You know, I’m going to stick my neck out,’” he says. “That hasn’t been happening.”

An Aerial View of Science

For all its challenges, science administration also presents unique rewards. “If you come to scientific administration as a fallback because you couldn’t get funding for your lab or because nothing else worked out, you’re not going to like it,” Eckstrand says. “But if you really like developing science from an aerial view, and if you have a certain tolerance for bureaucracy, then science administration can be very fun and rewarding.”

“It’s an opportunity to work with dedicated, smart, perceptive people and to be a part of science in a very different way,” agrees Covert. Most gratifying, she says, is when “things happen that wouldn’t have otherwise happened if I hadn’t been involved. I might casually mention an opportunity to an investigator, who then goes out and explores it and ends up getting funded.” At the other extreme, she says, “There are difficult situations—say, where an investigator falls ill or has other pressing needs—and the person on the other end of the phone line matters. A lot of our job is very bureaucratic and prescribed, because we have to maintain fairness, but there are other times when we just have to be human.”

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A MATTER OF POLICY

BY BRIAN VASTAG

FIRST PUBLISHED ON APRIL 18, 2008

In early 2005, Joseph Helble, a chemical engineer, entered the legislative fast lane. A few weeks earlier, the most powerful tsunami in decades had swept across Southeast Asia. Senator Joseph Lieberman (Ind-CT) wanted to know why that region lacked a tsunami warning system. So the senator turned to Helble, who was serving in Lieberman's office as a Roger Revelle Global Stewardship Fellow. Each year, that fellowship sends one mid-career scientist or engineer to a government office or nonprofit organization to work on global environmental policy.

"I walked out of [Lieberman's] office figuring, okay, now I need to figure out how to do this," Helble says. The next few weeks were "incredibly hectic." Helble quickly studied tsunami warning systems. He spoke with "everyone and anyone" who worked on tsunami warning technology and consolidated his findings into a memo and presented it to Lieberman, who decided on the spot to sponsor a bill that would fund a \$30 million system. Soon after, Helble found himself answering questions at a press conference called by Lieberman to announce the legislation.

"It's not the sort of thing you're prepared to do in academic work," Helble says, "but it was very illuminating how quickly things can get done when [a legislator] is committed to it."

Each year, several hundred scientists and engineers flood Capitol Hill and executive branch agencies in Washington, D.C., to get a taste of policy work. From 10-week get-your-feet-wet programs for graduate students to multiyear stints for tenured faculty members, scientists and engineers enjoy plenty of opportunities to explore science policy as a career path or as a means to broaden their knowledge and skills.

After their stints as policy advisers, scientists and engineers head in one of three directions, says Cynthia Robinson, director of Science and Technology Policy Fellowships at the American Association for the Advancement of Science (AAAS, the publisher of *Science Careers*) in Washington, D.C.: They go back to academia, they stay in the policy world, or they decide to do something completely different.

Helble decided to return to academic life, becoming dean of the Thayer School of Engineering at Dartmouth College. As an administrator, he constantly draws on his fellowship experience. “The skills I learned are directly transferable,” he says.

Savvy Scientists

“Our goal is to have more policy-savvy scientists out there in the world,” said Robinson. “We believe that’s of value whether they stay in government, go back to academia, or go on to the private sector or to a nonprofit organization.” Policy fellowships are also “a two-way street,” she says, where legislators and government agencies benefit from the fellows’ scientific and technical expertise.

Like Helble, about a quarter of all AAAS fellows return to universities or take other nonpolicy jobs. But almost half get “Potomac fever” and decide to stay in the policy world, either as a return fellow or as a full-time employee at their fellowship agency, at a different government office, or at an outside organization.

Saharah Moon Chapotin is one such fellow. She earned a Ph.D. in plant physiology from Harvard University but “kind of knew” she’d never become a professor. She first tried the 10-week Christine Mirzayan Science and Technology Policy Fellowship program offered by the US National Academies. Chapotin enjoyed working in Washington, D.C., so she applied for and won an AAAS policy fellowship, which lasts one year with a second often available. Chapotin is in her second year at the US Agency for International Development (USAID), where she enjoys the “big picture” view that working on biotechnology safety issues provides—a view she never had in the lab. Chapotin is hoping to stay at USAID permanently to shepherd the projects she’s been working on, such as a technology exchange program with West African cotton breeders.

While Chapotin is working on policies related to her degree, many fellows find themselves treading unfamiliar ground. Katherine Seley-Radtke, an associate professor of chemistry and biochemistry at the University of Maryland, Baltimore County (UMBC), spent a year at the US State Department as a Jefferson Science Fellow, a program for tenured faculty members. Jefferson fellows typically spend a year full-time at the State Department and then serve as informal advisers for five more years. Seley-Radtke was sent to Moscow as a scientist-diplomat to keep tabs on turmoil in the Russian Academy of Sciences. She soon found herself tasked with

briefing top US embassy officials on Russia's new nanotechnology initiative. As an organic chemist, Seley-Radtke wasn't an expert on nanotechnology. "But I certainly am now," she says.

As scientists, the Jefferson fellows "know how to go find the right information," Seley-Radtke says. And then they have to turn around and communicate that information to career diplomats and other nonscientists. As information "goes up the ladder, you certainly don't want the wrong information getting to the people who make policy decisions," she says. "You don't want the secretary saying the wrong thing. So you need to understand the technical details of a particular problem, even if it's not in your area, and then relate key points in a nontechnical way."

Policy Jobs for Former Fellows

Almost half of scientists who do the AAAS Science and Technology Policy Fellowships decide to stay in policy. Below are some job titles of former fellows:

- Associate Director, White House Office of Science & Technology Policy
 - President, National Center for Policy Research for Women & Families
 - Associate Director, Nicholas Institute of Environmental Policy Solutions, Duke University
 - Senior Science Adviser, Office of Science Policy and Planning, National Institutes of Health
 - Water Resource Specialist in Agriculture and Rural Development for South Asia, World Bank
 - Senior Adviser, Regional Conflict, Democracy, and Governance, US Agency for International Development (Kenya)
 - Regulatory Analyst, Biotechnology Regulatory Services, US Department of Agriculture, Animal and Plant Health Inspection Service
 - Special Policy Adviser to the Executive Director of the World Food Programme, Rome
 - Program Officer, Science and Technology, Global Development, Bill & Melinda Gates Foundation
 - Global Director, Fleet/Forces Department and Head, International Liaison Office, Office of Naval Research, US Navy
-
-

Taking It Home

Over and over, former and current fellows emphasize written and oral communication skills as keys to success in the policy world. “The kind of writing you do, the quick memos, it’s so different than writing grant proposals and papers,” said Seley-Radtke, who returned to her lab at UMBC but continues to advise the State Department on bioweapon threats.

Helble added that learning how to negotiate on Capitol Hill with “people with a broad range of dearly held opinions” has served him well as a university administrator. Also, he says, “The time scale in academic life is very different. When an issue comes up [on Capitol Hill], you need to digest it, understand the science and the ramifications of the science, and put it together in a coherent one-page memo—and do that all within an hour.” At a university, a similar project might drag on for months.

In her keynote address at the 2008 AAAS Annual Meeting in Boston, Massachusetts, Nina Fedoroff, the State Department’s top science adviser, emphasized the growing importance of policy-savvy scientists. She highlighted Alex Dehgan, a former AAAS science policy fellow at the State Department who persuaded former Iraqi weapons scientists to help rebuild their country. Dehgan, a behavioral ecologist and conservation biologist, also persuaded journal publishers to offer discount subscriptions to Iraqi scientists.

Fedoroff would like to see more scientists and engineers get involved in international relations. “The idea of serving as a science diplomat is only now getting on the radar screen of the average engineer and scientist,” said Fedoroff. “But now is the time for scientists to stop going back to business as usual.”

After his time in Washington, Helble, too, would like to see more of his colleagues take a similar path. “Look at all the issues—climate change, stem cell research, general environmental issues, health care, energy—that all have a fundamental scientific or engineering basis. And we complain that these decisions are being made in a vacuum without significant scientific or engineering input. Well, the way to fix that is for scientists and engineers to get involved in the policy process.”

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EXPLORING NONPROFIT ORGANIZATIONS

BY PATRICIA GOSLING
FIRST PUBLISHED ON MAY 2, 2008

Perhaps you've decided not to pursue a career in academia, but you're not sure about jumping into an industry job, either. Have you considered the nonprofit sector?

If you're passionate about a particular issue, mission-driven, and—in addition to your passion for science—desirous to improve the state of humanity and the world, you may be a perfect candidate for a job with a nonprofit. This article aims to give you a sense of the breadth and range of the possibilities open to you and a general sense of what nonprofits have to offer.

Where to Start

Not just soup kitchens and humanitarian aid, nonprofit organizations focus on nearly every issue you can think of: environmental protection, biomedical research, health care, education, international aid, disaster relief, science policy, and science awareness, among countless others. In the United States alone, more than 12 million people—some 9 percent of the work force—are employed in the nonprofit sector.

If you don't wish to stray too far from the bench, you can seek research jobs at the many well-known and well-funded nonprofit organizations dedicated to biomedical research; examples include the Howard Hughes Medical Institute (United States), the Fred Hutchinson Cancer Research Center (United States), and the Monash Institute of Medical Research (Australia).

Numerous smaller nonprofits, such as the Robert Packard Center for ALS Research and the Australian Stem Cell Centre, to name two, have a specific biomedical focus. Some midsized nonprofit organizations that hire biomedical researchers include SRI International (a nonprofit scientific research institute focused on innovative technologies) and the Institute for OneWorld Health, the world's first nonprofit pharmaceutical company, both based in California. These small and mid-sized organizations attract excellent researchers who are passionate about their work and committed to research in areas typically neglected by profitmaking companies.

If you've decided to pursue a career outside the lab but would like to stay in science, then the nonprofit sector has many options for you, including, for example, working in science education for an organization such as the Society for Science and the Public, as an outreach coordinator for the American Association for the Advancement of Science (the organization that publishes *Science Careers*), or as a program officer at the Alfred P. Sloan Foundation. Ph.D. scientists in agricultural or environmental sciences may choose to pursue a career at one of the many nonprofits active in the developing world, such as The Nature Conservancy and Earthwatch Institute.

Advantages

There are many issues to consider before starting on a career path in the nonprofit sector, including your personal and professional career goals. Here are a few of the advantages.

A wide range of excellent and compatible colleagues. Nonprofits often have their pick of the brightest and most dedicated candidates, many of whom share your values. Staff members typically have a passion for their work and are committed to effecting social change. The result in many cases is an atmosphere of passion, teamwork, and collaboration.

Excellent opportunities for professional growth. Due to the lower staff-to-project ratio in many smaller organizations—and often a flatter organizational structure—you may be assigned several projects and a wide range of tasks, offering you a better-than-average opportunity to strengthen your skill set.

Flexibility. Compared with a corporate enterprise, for example, nonprofits may offer more flexibility in setting and achieving goals, establishing benchmarks, and setting strategies for meeting the organization's mission.

Commitment. One big advantage for many is that nonprofit organizations, whether large or small, are committed to their mission, not to shareholders or to maximizing the bottom line. This philosophy, however, may lead to an organizational structure and management style that, for better or worse, can create tensions and obstacles regarding the best way for the organization to meet its mission and goals.

Disadvantages

Like any sector, nonprofits have some potential downsides.

Lower salary. Most but not all nonprofits pay salaries lower than those in industry. This is especially true of advocacy organizations. But there's a wide range across the nonprofit sector, so don't let this particular issue discourage you.

Higher employee turnover. There are many reasons for employee turnover in the nonprofit sector; burnout is high on the list, particularly if the organization is understaffed and you are required to multitask. Staff members may leave for better paying jobs, to switch sectors, or to return to school. Often, the smaller nonprofits lack professional development tools aimed at retaining employees.

Limited opportunities for career advancement. At smaller nonprofits, like most small organizations, upper management is very stable, so you might have to switch to another organization to advance in your career.

Structural differences. If you thrive on hierarchy, discernable targets, and clear deliverables, small and medium-sized nonprofits might not be for you. Organizational clarity may be lacking, as these smaller nonprofits strive to fulfill their missions with limited staffing and resources. In larger and better funded organizations, these differences from industry tend to be less pronounced.

Fundraising. Depending on the type of nonprofit, much time will be spent raising funds and writing grants.

Understand personal and professional goals.

Is Nonprofit Right for You?

How will you know if working in the nonprofit sector is right for you? Understanding yourself and your personal and professional goals is a first step. If you're passionate about a particular issue, and you like the idea of giving back to the community or making the world a better place to live, then a nonprofit organization may be the perfect place for you to launch your career.

Whether you're considering a job at a particular nonprofit or looking for a nonprofit organization to work for, you should, as in any job search, thoroughly research the organization while keeping a few sector-specific issues in mind as you explore your options.

First, look carefully at the organization's mission statement, which you can almost always find on its website, to decide whether its mission is one you're passionate about (or, at a minimum, one you can believe in). Next, look at the organization's staff profiles to see if the type of people it employs fits your skills and career ambitions. Finally, take a look at the annual report to see what kind of operating budget the organization has and how funds are allocated. This information will give you crucial clues about how the organization goes about achieving its mission, the type of people it hires, and the stability of its finances. Try, if possible, to contact someone who works for the organization, or a former employee, to get a better sense of its structure, culture, and day-to-day operations.

Once you make it to the interview stage, no matter the size or renown of the organization, ask some key questions to get a better sense of the organization's operations and how it treats its staff.

- What is the structure/hierarchy of the organization? How are decisions made and communicated to the staff?
- Does the organization encourage teamwork and collaboration, or do staff members work independently on projects?
- What opportunities are there for advancement within the organization and/or partner organizations?
- What kind of training will I receive? What opportunities exist for professional development?
- What are the organization's near-term and long-term goals?
- How is the organization funded and what type of operating budget does it have?

The answers to these questions may help you align your possibly idealistic expectations with how things really work. Even if the organization is doing excellent work to improve the state of humanity, you can be sure that petty grievances, turf wars, and other aspects of interpersonal friction will be present—just as in any profit-making corporation or bureaucracy-laden government institution.

Finally, ask yourself: Am I passionate about the organization's mission? Is this a place I would like to come to work every day? Do the organization's goals and objectives fit with my own interests and values? Do I see this as a first step in a career progression of increasing responsibility?

The nonprofit sector isn't for everyone, but for many, particularly those making the transition from academia, the values and culture inherent in the nonprofit world may offer an exciting and rewarding career choice.

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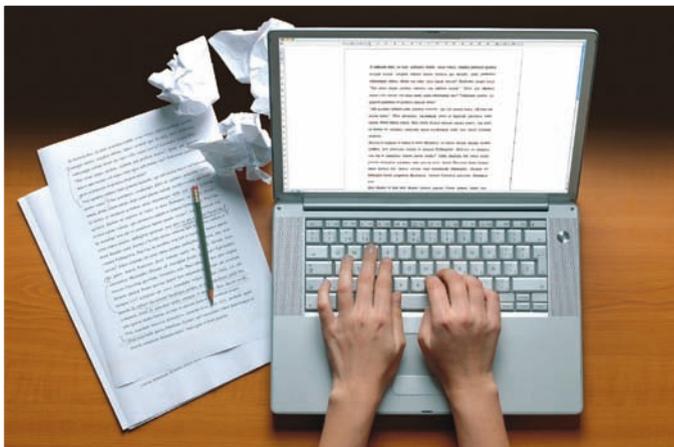
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SCIENCE WRITING: SOME TIPS FOR BEGINNERS

BY JIM AUSTIN

FIRST PUBLISHED ON MAY 20, 2005

As a writer, an editor, and a former scientist, I rarely give a public presentation that I'm not approached afterward by at least one scientist—often more—aiming to leave the bench and become a science writer. So here I'm passing along the advice I offer on those occasions, hopefully in a more coherent form.

For serious, talented individuals who are willing to approach the transition with seriousness and focus, the odds are not as bad as you might think. When I first started trying to make a living as a freelancer, it seemed the world was teeming with talented writers but that paying gigs were few. Then when I became an editor, suddenly the reverse seemed true: there were too few capable writers around. One, or maybe two, conclusions seem justified: the real difficulty for writers *and* editors is making the right connections. And, apart from the basics, the most important skill a science writer can gain is the ability to understand and then meet the specific needs of a particular editor and her publication.

If you aren't a good writer—or unless you have some other gift that will serve you well in this profession—pick another career. I don't mean to suggest that you have to have phenomenal rhetorical skills in order to make it as a science writer. Many science writers aren't gifted at

spinning prose. Some get by with a good nose for news, strong research skills, and hard, careful work. Others never learn, and struggle along for years, never finding their work satisfying and leaving a trail of editors convinced they didn't get their money's worth.

There are easier and more lucrative ways for science Ph.D.s to make a living. If you're not finding that your prose comes easily and don't feel a real compulsion to write about science, keep looking; you'll find your calling.

Advanced Scientific Training Can Work Against You

In some ways, scientific training is poor preparation for a career as a science writer. The problem is that science as it is usually practiced and communicated is just too narrow to serve the needs of a typical audience. As a scientist you learn to care deeply about tiny details that general readers care little about; even scientists working in related fields may not find the details of your work compelling.

Yet, scientists with a broad perspective are often viewed with suspicion by their peers. And then there is the matter of science's conspicuously compact and jargon-laden language, which is, perhaps, the most efficient means of communicating with other experts but is a lousy way to tell a good story. One other point that works against you: increasingly, established scientists are pursuing science writing as a sideline, taking work away from full-time professionals. The result: widespread resentment of people with science backgrounds entering science writing.

This resentment wouldn't be a problem were it not for the fact that some of these people go on to become editors, and will, therefore, be reading your queries critically and evaluating your credentials. You will get a fair reading, almost always, but don't expect any special favors.

Is there merit to the charge that you are taking their profession too lightly? Well, are you? Science writing is indeed a profession full of dedicated individuals doing difficult, painstaking work, and doing it brilliantly. The most accomplished science writers deserve just as much respect as the most accomplished scientists. No one should take this profession lightly, or enter it on a whim.

Yet, many successful science writers chose science writing as an alternative career, on the rebound from the bench, or just stumbled into it. If you're serious and capable, you can do it, too.

Is there any advantage, then, to having an advanced degree in science? There is. There's a trend, especially at high-end journals aimed at scientists, toward hiring advanced-degreed scientists who also happen to be very good writers (with excellent training and experience). If you already have top-notch writing skills, an advanced degree in science is a strong credential, even if it's not an essential or a terribly time-efficient one.

But there's another good reason why advanced scientific training is advantageous: it can make you a better journalist.

Some people in this profession make a distinction between science writers—whose job is to clearly and accurately describe interesting science in plain language—and science journalists—whose job is to get to the bottom of a story, to figure out what's really going on behind the scenes, who the main players are, and what the real “scoop” is.

Unless you happen to be writing about your narrow specialty, which probably won't happen nearly often enough to make a career, your scientific training won't help you much to become a better science writer.

But scientific training *will* help you be a better journalist. Many of the old salts among today's science writers started out as journalists then switched over to the science beat after acquiring a measure of reportorial savvy, and that's what makes them good science writers.

Many of the skills of science and journalism are very similar. If during the bench-science phase of your career you manage to make yourself into an effective researcher, then those same aptitudes—especially a healthy skepticism and a belief that every problem has a solution—will make you a better journalist. You won't be satisfied with describing surfaces when there's something deeper to explore.

Any Advice on Query Writing?

Not directly. Pick up a copy of the National Association of Science Writers' *Field Guide for Science Writers*. This paperback is the best resource I know for aspiring science writers. It includes advice on writing queries and on many other topics.

The best advice I can give about query letters is to do your homework, network, and always to write queries appropriate for the publication. Once you are established, the editor will trust you to deliver a sound product every time. When you're just starting out, you can sometimes accomplish the same thing by convincing the editor that you're serious, have potential, and deserve a break. Familiarity, in this case, breeds content. See below.

Specialize. Science is too large a beat for anyone to cover, so choose an area and get to know it. You may find your area of specialization doesn't overlap with your training. Andrew Fazekas, *Science Careers'* Canadian Editor, has a Master's degree in wildlife biology, but as a writer his specialty is astronomy and space science.

There's another respect in which it is important to specialize. There's a tendency, when first starting out, to view query writing as equivalent to buying a lottery ticket. If you pitch a story enough times, the reasoning goes, someone is bound to catch it. For the aspiring writer this approach has a certain psychological appeal: It requires lots of busy-work so you feel like you're doing something, but it doesn't take much of an emotional commitment. It feels safe.

That safety is precisely why it's a bad approach. Any career transition requires a serious investment. You have to take some chances. Here's another reason: As I suggested earlier, it's all about making connections, and that isn't something you can do casually.

Do your homework and work only a few publications at a time. Choose well: there's no point in wasting time on publications that don't publish new writers.

Then put some eggs in those baskets. Study the publications you target until you know them inside and out. What categories of content do they publish? How are the articles structured? Who generally writes the articles in each category—staff writers or freelancers? Know precisely what the editors are interested in, then write a query that promises them what you already know they want.

Be patient and build long-term relationships. Even if your first query isn't accepted (it probably won't be) keep reading, keep studying, and take every opportunity to get your work in front of the editor.

My first contribution to *Stereophile*, a publication I still contribute to occasionally, was a letter to the editor that was posted online. That letter was the beginning of a regular (but not too frequent) correspondence between the magazine's editor and me. My second contribution to *Stereophile* was a personal essay that was published on page one. The time between first contact and first paying gig: about two years.

Take every opportunity to publish good writing. Science writers are always griping, understandably, about the beginners and hacks stealing scarce work and driving rates down. So the whole universe of established science writers will hate me for giving this advice, but I'll give it anyway: Get your work out there, even if it means giving it away at first. Paying gigs are better, but every "clip" helps. When you send in clips to a new editor, she's not going to know how much they paid you.

She will, however, know if it's a hack job. So don't allow anything to be published that isn't your best work, even if you don't get paid.

Savor the experience. Good work, whether it's science, science writing, or something else, is a great privilege, one of life's most consistent rewards. One of the great virtues of an early career transition is that, with its very difficulty, it can help you to appreciate how precious the opportunity is to do meaningful work and do it well.

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