

CAREER TRENDS

Finding Your Personal Job Chemistry



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Introduction

The keys to building a fulfilling career go far beyond the daily tasks of the job. Real success comes to those scientists who find themselves working in an environment that suits not only their skill sets, but their personalities as well. Finding this balance can mean the difference between a tolerable job and a truly rewarding career.

Science Careers has published numerous articles over the years on how to think about your career in an effort to guide you down a path that is tailored for you. In this booklet—*Finding Your Personal Job Chemistry*—the goal is to help you assess your own strengths, and perhaps your weaknesses, to find the best fit for you in the scientific landscape.

Whether you yearn to do research in a lab, communicate science in new ways, teach, or anything else, you want to be sure that you are being true to your skills and your passions and that you are surrounded by colleagues who support and inspire you.

We hope you'll find some inspiration in this collection of articles focused on helping you find your own job chemistry. Good luck!

The Staff of *Science Careers*





It Pays To Plan: Why You Need a Career Map

By Carol Milano—December 3, 2010

“A body of research shows that people who take the more deliberative approach of setting goals have a better likelihood of meeting them,” observes Jennifer Hobin, Ph.D., Director of Science Policy at the Federation of American Societies for Experimental Biology (FASEB). That deliberative approach is a career plan: a roadmap guiding you from where you are now to where you’d like to be in one, five, or even ten years. This personal map, or “individual development plan” (IDP), evolves through thoughtful self-discovery. Take time to reflect. Explore your talents, wishes, and realistic opportunities. Creating your IDP will gradually identify professional development needs and career objectives, and pinpoint milestones along the way to each goal.

Taking the First Steps

A year before completing your Ph.D. or fellowship, start building your plan, advises Susan Morris, a career coach with Morris Consulting Group in Doylestown, Pennsylvania. Self-assessment is the crucial first step. Ask yourself some key questions. Take time to think carefully—and be honest.

- 1. What are your greatest successes?** What do you love about what you do? What inspires you to keep working in this area? Have you had a stimulating internship, job, or project outside your current focus? It’s vital to identify the work elements you care most about.
- 2. What kinds of settings do you like picturing yourself in?** Is it an office at a company, in a government agency, or at an academic institution; indoors, outdoors, in a lab?
- 3. Which options do you already think about?** Do you know anyone with that sort of job? For an IDP, it’s valuable to get a realistic picture of it on a day-to-day level.
- 4. Consider work style and personality.** Would you rather be part of a team, or work mostly on your own, meeting occasionally with colleagues? Are you comfortable with grant-seeking and publication needs? Would you enjoy mentoring or management as everyday responsibilities? How much autonomy or structure do you need?
- 5. Look at external factors.** Is family time, or an easy commute, significant? Is high salary a priority?

Career planning is interactive. Thoroughly assessing your strengths requires checking with mentors, colleagues, or friends who’ve seen you in various roles. We barely notice things we do effortlessly—like organizing or informally leading people—but they’re touchstones in career assessment.

Use established services, such as your university’s career planning office. Your specialty’s professional association, or cross-discipline national groups like Association for Women in Science, may have volunteer career advisors. FASEB’s online tools can ease the IDP process.

Identifying Your “Ideal Job”

Each step builds on what you’ve already discovered. Identify directions surfacing from the personal information you’ve gathered. Thinking about work settings helps clarify what someone doesn’t want, Morris finds. They might realize, “I don’t want the private sector—I was born to teach,” or, “I’m a botanist. I don’t want to be inside an office.” Another scientist may say, “As a molecular biologist, I need to be in an institution’s research department,” or, “I want to be an entrepreneur. I know I need some business experience first.”

Explore every interest. Late in her University of Michigan Biological Psychology program, Hobin realized an academic setting did not attract her. She started analyzing her work habits for clues about other possibilities. “I always read news and policy articles before science articles, but I had no idea what ‘science policy’ was,” she remembers. “I Googled it, read papers, and stumbled onto fellowship programs designed to help Ph.D. scientists transition into science policy.” During her 10-week National Academies fellowship, she learned about the FASEB position, and was hired in 2005.

“Don’t have the tunnel vision that academia is the only track,” urges Ignacio Munoz-Sanjuan, Ph.D., vice president of biology for a private nonprofit research foundation since 2007. During his doctoral work in genetics and molecular biology at Johns Hopkins Medical School, Munoz-Sanjuan grew “disillusioned about the dependency on peer review to make a living [in academic science], and universities’ lack of appreciation for teaching excellence when evaluating for a tenure position. Everything depends on the publication record.”

A narrow view of “academia” is tunnel vision, too. Talented, enthusiastic scientists have richly varied academic opportunities. If you love teaching, consider educating high school students or liberal arts undergraduates about science. Are your organizational skills strong? You might like admissions or administrative work at a science program. Do you write well? Universities need grantwriters and public information specialists. Look beyond the lab at your own institution to spot jobs matching your abilities and preferences.

A colleague introduced her to the editor of a start up online biomedical magazine. Her science editing job there revealed an eagerness to write. “I’d trained for years to be a scientist, and then a one-day workshop in non-fiction writing became a transformative act. I got so much out of it.” Schachter used her science credentials to sell a story to the New York Times’ Technology section. Her science communications career was launched.

As you develop your IDP, mentors can motivate and mobilize you, helping you recognize and overcome barriers. Periodically ask your mentor for feedback and assistance. You'll probably gain new perspectives on your assets and potential.

Less traditional mentors can offer valuable insights, too. Antonina Roll-Mecak, Ph.D., chief of the National Institutes of Health Cell Biology and Biophysics Unit in Bethesda, values 'passive mentoring.' "If you're in a lab with a lot of successful people, see how the science is done at a more advanced level. Watch how they manage their research, how they create a rewarding, fun atmosphere," she recommends. A peer mentor, Morris suggests, might be someone a year ahead, perhaps in a first job, who could keep you focused and on-track, while sharing any pitfalls they've encountered.

"Mentors are typically in your own environment," says Hobin. Because opportunities for Ph.D. scientists range from patent law to science education to drug development, "connect with people in different areas. Identify potential mentors in industry, government, or any field you may be interested in." You may want to talk to a pharmacy or business professor at your university. "Always keep your adviser in the loop," Hobin advises. "Many faculty understand that they can't provide insights into all possible career directions." Her own adviser said he knew little about careers in industry, but added, "I have an ex-student..."

"If you're in a lab with a lot of successful people, see how the science is done at a more advanced level. Watch how they manage their research, how they create a rewarding, fun atmosphere."

Antonina Roll-Mecak, Ph.D.

Assessing Opportunities

The next step is exploring your options. Scientists have a huge asset: knowing how to investigate. "Research jobs that are actually out there," says Morris. Talk to people working in them to discover what they're really like. "Name specific companies in which you might be interested. The human resources department is not where decisions are made. Target a particular department. Who heads it? Use social networking to meet them. Sharpen your focus so it's easier to zero-in and reach that key individual. Go to places where decision-makers gather, especially their conferences. Read their journal articles."

As you research, seek student organizations, including postdoc clubs or committees at your own institution. Meet other young scientists through national groups like Women in Cell Biology or the National Postdoctoral Association. "You can reach out without being a member," Morris notes. When you identify a contact, say, "I understand you recently got this job. I'm looking for someone to advise me." An editor told Schachter about the National Association of Science Writers. After chatting with editors and more experienced writers at the local chapter meeting, Schachter soon joined its steering committee; valuable contacts led to choice assignments.

Are you considering industry? "Educate yourself about research going on in the private sector. If you have a chance to focus now on questions of more interest to the private sector, make that choice," Munoz-Sanjuan advises. Learn which specialties or exper-

tise become more desirable beyond academia. "Be proactive about doing work that puts you in the best position to get a research job."

What size employer appeals to you? "Sometimes working in a lean organization, with greater responsibility, makes you more marketable to lead research in a bigger company. A big company is different, fraught with political issues. Consider which of your options are the most science-driven," Munoz-Sanjuan suggests.

Informational interviews are a vital exploration tool. "Talk to as many people as possible," Hobin encourages. "It never hurts to contact someone in a position or field that you might be interested in. Invite them for a cup of coffee. Ask for 20 minutes—the worst they can do is say no. People often enjoy talking about what they do." Use the opportunity to ask about the person's or company's research, the time required for non-science tasks, and personality-related factors, including teamwork or management requirements.

"Most scientists in business are surprisingly open to talking about their work," Munoz-Sanjuan echoes. "Don't be afraid to ask, investigate, meet people, and learn how companies work."

Setting and Pursuing Goals

You've identified your skills and interests, and researched some possibilities. Now, "Start honing in on a path that might be right for you. Then, plan steps towards that goal," says Hobin. Career goals should be specific and measurable, with a time line and target dates.

"Take time during graduate and postdoc training to develop transferable skills," she counsels. "Communication, project management, writing, and leadership [ability] are important for careers both in and beyond academia." How can you add that to an overcrowded workday? "Find opportunities in the context of lab time and the scientific work you already do. Branch out. You could give non-technical science talks to a Sierra Club chapter, write for your university's alumni magazine, or mentor some undergrads."

Schachter branched out with small editorial assignments, helping scientists improve their writing. She enjoyed this new direction so much, she decided to try giving workshops about written communications, but realized she needed stronger verbal skills. She joined Toastmasters—"a great opportunity for me to explore all kinds of speaking and presentation styles." Now, Beth Schachter Consulting provides seminars and coaching at major medical schools and research institutions. "I'm a scientist at heart," Schachter emphasizes. "It's so much fun for me to read the science, and think about how it can be presented more clearly."

Pinpoint specific tasks to help you pursue your goal. Roll-Mecak knew what she wanted: "I'm passionate about what I do, and couldn't imagine doing anything else with my life," she avers. As a University of California San Francisco postdoc, she turned to her mentor, Henry Bourne, and postdoc adviser, Ron Vale. Roll-Mecak identified "research institutions and universities with strong programs in my interests: biochemistry, structural biology, and cell biology. I discussed the pros and cons of each institution, and the differences in scientific cultures."

She applied to twenty-four places, using just three criteria: the qualifications of the colleagues she'd have there, the institution's research programs, and the location. "I knew I didn't want to live in certain areas of the U.S.," Roll-Mecak explains. "Before and during the interview process, I bounced ideas and problems off [Bourne and Vale] when trying to make a decision."

Building a Network

Networking, the cornerstone of any career plan, is a chain. Reach out. Leave the lab! Attend science cafés and professional organizations' meetings. Join a committee, or write for the members' newsletter, to strengthen both contacts and transferrable skills. Try informal gatherings, too—like DC's science policy happy hours, or Science Writers in New York's quarterly socials.

As you talk to people, keep an open mind, and keep in touch. At a Helen Hay Whitney Foundation annual meeting for fellows, Munoz-Sanjuan chatted about research with a former professor who had moved to Merck. "A year later, he told me about an opening there." After his fellowship, Munoz-Sanjuan joined Merck's Neuroscience Center outside London. His second job came through an executive recruiter. "I never knew there were headhunters when I finished my postdoc! Some specialize in one area, like neuroscience. They go to meetings to make themselves known."

"Things are changing in science," Morris stresses. Once, "you could stay at a particular job for three or five years; now that may be down to two. No one has control over downsizing. The first year is always critical. Planning beyond that is harder, but ideally, you want to know where you'd like to be by the end of your third or fifth year."

To stay on track, check in with yourself once a year. Do you like what you're doing? Can your job lead to something desirable? Where do you want to be in two years?

In 2020, "I hope that I'll still be producing interesting science and taking risks," says Roll-Mecak. "If I already knew where I want to be in ten years, I think it would be really boring!" she confides.

For the next five years, Munoz-Sanjuan aspires to continue building his career at his current foundation. "I want to bring new therapies to people with Huntington's disease, and hope to steer the research in ways that let me achieve that." Look at your career as a continuum, not as one stop, he recommends. "If you choose a position now, that doesn't mean it's for the rest of your life. It's always a dynamic process."

Take the first step in your own dynamic process—get started on your career plan!

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Careers Beyond the Bench

By Laura Bonetta—March 5, 2010

Did You Hear the One About the Former Scientist?

A December 15, 2009, *New York Times* article with that headline described the plight of a biologist who completed his graduate studies at the University of California, Davis before becoming a stand-up comic. Although comedy is an unusual choice, most Ph.D.-trained researchers will eventually pursue, out of choice or necessity, nonacademic careers, according to a survey by the National Postdoctoral Association. In 2003, among Doctorate degree holders who received their degree four to six years previously, only 19.8 percent were in tenure-track or tenured positions at four-year institutions of higher education.

For Ph.D.-trained scientists who do not end up with faculty positions, there are research opportunities in private or government institutions and industry. But increasingly career choices take scientists not just away from academia but away from the bench altogether—into areas like science writing and editing, public relations, science policy, scientific program or grant management, science teaching, patent law, and venture capital.

So how do you move beyond the bench?

Find What You Are Good At...

Both as a graduate student and postdoc, Maryrose Franko took every opportunity to volunteer in science education which made her realize that "I have good people skills that I really enjoy using," she says. "I also discovered that, although I enjoyed doing benchwork, I always looked forward to going into a school or giving a talk or judging a science fair."

While conducting her postdoctoral research at the US National Institutes of Health (NIH) in Bethesda, Maryland, she helped with the Student-Teacher Internship Program run jointly by NIH and the Howard Hughes Medical Institute (HHMI). Through the program she became acquainted with some of the administrative staff at HHMI. "When a position opened up at HHMI, they suggested I apply," she recalls. "I thought that this would be a great way to utilize my people and scientific skills. And this was a wonderful opportunity to make the best out of all my strengths."

She joined HHMI in the spring of 1995 as a program officer and has since moved through the ranks to senior officer in charge of several fellowship programs for graduate students and postdocs. "I spend a lot of time talking to people in the science education community, giving presentations, talking with my grantees, reading reports,



and preparing reports,” says Franko. To be successful at this job, she adds, “it takes a collaborative person and one who doesn’t need or want credit for his or her ideas.”

Both private and government-run funding agencies typically hire grant administrators and program officers with graduate degrees. “My job is to evaluate science education needs. I also give feedback to graduate student applicants and make sure that the research they are proposing is fundable by our mechanisms. I assign applications to review based on research area. I organize conferences by grantees and assign talks to different sessions based on research field,” says Franko. “I could not perform any of these tasks without a Ph.D.”

...and Follow that Path

Andrea Stith joined HHMI straight from graduate school. “I met an HHMI investigator during a symposium when I was a biophysics Ph.D. student at the University of Virginia,” she recalls. “He helped me set up an informational interview at HHMI, which several months later resulted in my applying for a position administering grant programs.”

But after a few years at HHMI, Stith discovered that her true passion was science policy. She is currently at Shanghai Jiao Tong University doing research on higher education and research policy. “I anticipate returning to the United States in the next year or so and would like to continue pursuing international policy issues, possibly taking a position in the government or in the nonprofit sector,” she says.

Stith got her foot in the science policy door through a fellowship at the National Science Foundation’s Office of Legislative and Public Affairs through AAAS’ Science and Technology Policy Fellow program—but her path is far from typical. “I have met so many people who have come to science policy in unique and personal ways and at very different points in their careers. Some have science backgrounds, others don’t,” she says. “I can’t identify a single best way to get here.”

Create Your Own Opportunities

Although a few training programs offer students exposure to different careers—such as science policy and science writing—some people have had to create their own paths.

When Chris Gunter was doing her postdoc in the lab of geneticist Huntington Willard, then executive editor of the journal *Human Molecular Genetics*, she approached him with the idea of a fellowship to help him with editorial tasks at the journal. He agreed and she ended up working half time on her postdoctoral research and half time on the journal. And when it came time to apply for a job she decided to pursue a career as a journal editor. “You have to be honest with yourself. Not everyone is going to be an academic PI,” says Gunter. “And I was really interested in editing. When I read a paper I would ask myself ‘Why is this paper in that journal?’”

At first her postdoc adviser was surprised by her choice. “He cautioned me that, if I were to step off the research track, that would be an irreversible decision,” she recalls. “But once he realized that is what I wanted to do, he was very supportive.”

Gunter eventually took a post at the journal *Nature* where she spent seven years as the editor responsible for manuscripts in the field of genetics. Those experiences and the wide network of contacts she established then led to a job offer as director of

research affairs at the HudsonAlpha Institute for Biotechnology in Huntsville, Alabama. “My job is to make things happen,” says Gunter, who is responsible for everything from helping to write grants, to recruiting scientists and students, to writing and editing papers, to publicizing institute discoveries, to organizing seminars and conferences, and fund raising. “You have to be able to multitask because many things have to move forward each day,” she says. “And you have to be able to communicate to many different audiences.”

Mark Toone went to a similar position straight from the bench. After completing a two-year post as associate scientist at the Paterson Institute for Cancer Research in Manchester, UK, Toone started looking for a permanent position in either academic research or research administration. At that time, Tony Pawson had taken over as director of research at the prestigious Samuel Lunenfeld Research Institute in Toronto, Canada, and was looking for someone to help run the institute. Having completed his graduate studies in Toronto, Toone jumped at the chance.

He was hired by Pawson and then obtained a Master’s of Health Administration at the University of Toronto while working full time. That led to his current appointment as director of research operations, where his role is to “oversee laboratory operations, safety, and a range of institutional services, as well as new laboratory design and construction.”

Toone first got turned on to the value of research administration during his postdoc at the Imperial Cancer Research Fund (ICRF; currently Cancer Research UK) in London, UK. “At the time ICRF had split its administrative duties between two highly respected scientific leaders, Dr. Paul Nurse, who looked after the scientific side of things, and Dr. John Tooze, who looked after the operations side,” says Toone. “After talking with John Tooze, I began to consider a change in career plans.”

Toone says that graduate school programs should put more emphasis on preparing students for different careers. “My advice for a grad student or postdoc would be to enhance your research qualifications either through work experience or formal management, project management, computing, intellectual property—whatever interests you—so that you can more easily step into stimulating roles outside of research,” he says. “My position allows me to participate in great science without having to pipette anything.”

“I have met so many people who have come to science policy in unique and personal ways and at very different points in their careers. Some have science backgrounds, others don’t. I can’t identify a single best way to get here.”

Andrea Stith

Marrying Different Fields

Many careers paths marry science with a different field. Mikhail G. Shapiro's background was originally in business. After he co-founded Cyberkinetics Neurotechnology Systems, he became fascinated by scientific research. "It seemed so cool to actually come up with the innovation," he says. As a result, he completed a Ph.D. in biological engineering at the Massachusetts Institute of Technology. He then joined Third Rock Ventures, a venture capital firm based in Boston, where he works at the intersection of business and science. "We look for innovation in science or medicine and bring that innovation to patients by providing the capital and expertise of building a company," says Shapiro, who is a senior associate at Third Rock. "It is extremely rewarding."

He spends a lot of time talking with thought leaders in different fields, either at conferences or while visiting research institutes and biotech firms. "At our firm we don't just sit at the computer looking at business plans of companies," he explains. "We are more proactive. We will explore a scientific area and talk to experts in that area to understand what is possible. And then we might start up a company." His advice for people who would like to explore this path is to "spend some time in a startup company, even if you are just working at a bench," he says. "At the end of the day, if you are interested in making an impact on society and patients, this is a great way to do it."

Another career that marries science with the business side of science is patent law. James Dilmore went from bench to patent law straight after obtaining his Ph.D. in 2000 from the University of Pittsburgh. "The wife of one of my Ph.D. committee members was working at a law firm as a scientific adviser and was about to leave the position, so she introduced me to her boss," he recalls.

But leaving the bench was not an easy decision. "I was very well versed in several areas of cellular neuroscience. I had spent a lot of time and effort developing those skills and knowledge. I recognized that I would not be using the experimental techniques directly and that I might not be working on my specific areas of expertise," he recalls. "It was a bit unnerving, honestly."

Nonetheless, he took the plunge. He first joined the Pittsburgh-based international law firm Reed Smith as scientific adviser. After passing the patent bar exam in April 2002, Dilmore became a patent agent at the firm. His responsibilities include drafting and filing patent applications on behalf of several clients, as well as continuing to assist attorneys involved in litigation cases.

He cannot, however, do things like file appeals from the US Patent and Trademark Office (USPTO) to courts, negotiate licenses to use patented technology, or sue those who breach contracts or infringe patents—tasks that require a law degree. So, Dilmore decided to take the plunge once again and last year started attending law school while working full time. "My kids got to the ages, 12 and 15, where I had somewhat more free time. It also made sense in terms of career progression for me to obtain a law degree," says Dilmore.

Taking a Risk

Dilmore did not have any experience in law before joining his firm, but his career choice turned out to be a good fit. His advice for science Ph.D.s considering a law career is to look at some patent applications that are freely downloadable from USPTO website. Also, most universities offer courses in intellectual property that any student

...the most important thing is "to make sure you are running to a job you really think you will enjoy and be good at—and not running away from a job that you are not enjoying or at which you are not currently successful."

Maryrose Franko

can take. Some universities also have intellectual property or technology transfer offices, where students may volunteer or intern.

Like Dilmore, Teresa Calzonetti had not done anything other than research before becoming an instructor at Frederick Community College—a two-year college in Maryland where she teaches an introductory biology course to about 40 students. "I always thought that I would like teaching, but I had no teaching experience," she says.

She called the head of the biology department at the college and applied for a part-time teaching position, which she obtained three weeks before classes started. "I did not sleep for those three weeks," she says. Having taught the class for two years now, Calzonetti has gotten over that initial anxiety and is getting ready to increase her teaching load. "I would like to teach more sessions and new classes," she says. "In addition to enjoying teaching science, the best thing about the job is that I am getting to learn all the stuff again. Its like I am taking a course and every semester I am interested in it all over again."

Making a transition from research can be a scary proposition and one that many students and postdocs will have to make without any support and guidance from their research mentors. "My advice to graduate students and postdocs is to network and know a lot of different people," says Gunter. "And do what appeals to you. Don't just listen to what people say you should do, especially if they think you will be a failure unless you stay in research."

Regardless of the chosen path, says HHMI's Franko, the most important thing is "to make sure you are running to a job you really think you will enjoy and be good at—and not running away from a job that you are not enjoying or at which you are not currently successful. You should do as much research as possible through informational interviews, volunteering, and internships, to make sure that you do not need to be doing bench research to be challenged and satisfied in your job."

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Choosing Between Science and Caring?

By Beryl Lieff Benderly—December 3, 2010

Very close to 100 years ago, history's most famous female scientist won the second of her two Nobel Prizes (physics in 1903, chemistry in 1911). As the centennial of that milestone approaches, women remain a decided minority in the fields in which Marie Curie so excelled. That they now match or exceed men in the number of life science Ph.D.s and medical degrees awarded makes the contrast with the physical sciences and engineering all the more striking.

For many years, attempts to explain this discrepancy focused on women's supposedly inherent inferiority in math. Rapidly improving achievement has since torpedoed that hypothesis. More recent explanations have emphasized social and personal obstacles, such as discrimination and isolation, that women face when they enter or try to advance in male-dominated fields. Accounts of such tribulations abound, including, recently, Baruch College historian Julie Des Jardins's enlightening *The Madame Curie Complex: The Hidden History of Women in Science*.

But new research raises an entirely different possibility. It isn't just that young women give up or are excluded from studying science, this work suggests. Rather, many simply don't choose it in the first place because they believe it "especially incompatible" with goals and values they consider important. "Interest in some careers and disinterest in others results from the intersection of people's goals and their preconceptions of the goals afforded by different careers," write psychologist Amanda Diekman of Miami University in Oxford, Ohio, and co-authors in a paper titled "Seeking Congruity Between Goals and Roles: A New Look at Why Women Opt Out of Science, Technology, Engineering and Mathematics Careers," published in the journal *Psychological Science* in July. "Because women in particular tend to endorse communal goals," the paper continues, "they are more likely than men to opt out of STEM [science, technology, engineering, and math] careers in favor of careers that seem to afford communion."

"Helping others," "serving humanity," "connection with others," "working with people," and "caring for others" exemplify the "communal" goals that women college students on average said they preferred when asked what they wanted to accomplish in their careers. Male students, on the other hand, more often indicated what psychologists call "agentic" goals, such as "demonstrating skill or competence" and seeking "power," "mastery," "independence," "recognition," and "achievement."

People's self-confidence about doing math and science (which psychologists call "self-efficacy") influenced their preferred career goals, but their math and science ability and experience (as demonstrated by their course grades) did not. Both genders, however, agreed that "STEM careers afford communion significantly less than" fields the researchers term "non-STEM male-stereotypic" (MST), such as law or medicine, which have a history of being dominated by men. Careers in the MST category "in turn afford communion less than" those such as social worker, registered nurse, or human resources manager, which the researchers call "female-stereotypic" because of their historic dominance by women.

"We don't really want to imply that prejudice doesn't exist [or] that there aren't self-efficacy differences" between men and women that can hamper women's success in science, Diekman tells *Science Careers* in an interview. "I think those problems deserve a lot of attention." But, she continues, so does "this other question: ... are [science] careers seen as things that women want to do, given the average differences between men and women" in what they say they hope their work will accomplish?

"Because women in particular tend to endorse communal goals, they are more likely than men to opt out of STEM [science, technology, engineering, and math] careers in favor of careers that seem to afford communion."

Amanda Diekman et al.

The Obstacle Course

Investigations into women's underrepresentation in hard science often appear to be based on a very different assumption: that scientific work is so self-evidently worthwhile and attractive that people with the ability to do it will choose to do so. Over the years, a great deal of work has gone into discovering and helping women overcome the stumbling blocks that can impede progress toward science careers. In November, for example, Arizona State University (ASU) launched CareerWISE, an innovative Web site that provides interactive tools and resources as well as strategies and encouragement for women pursuing physical science Ph.D.s. Supported by the National Science Foundation and based on extensive research into women scientists' experiences, the site aims "to address ... instances where women experience discouragement," explains its originator, ASU counseling psychologist Bianca Bernstein. This online teaching resource is designed to "help women combat those ... experiences so that they feel that they can pursue their dreams and ... survive and thrive in the environments of Ph.D. programs and in their future careers."

The site's resilience-training program is crafted specifically for women, but it can help Ph.D. students of both genders "understand [themselves] when difficult things happen, learn to understand the situation and other people, and then strengthen skills to respond to those situations in an effective manner," Bernstein

says. It combines written content with “herstories,” which are “clips from video-taped interviews with Ph.D. women in science and engineering” that recount common problems and approaches useful for solving them.

Choosing Science—or Not

Long before a woman faces the rigors of a Ph.D. program, she must opt to pursue a scientific career in the first place. Diekman’s data suggest that many college students on the verge of setting a career direction see STEM careers as “inhibiting communal goals,” the article states. Because more women than men favor that category of goals, “it is not surprising that even women talented in these areas might choose ... career paths” other than science. “Understanding communal motivations can provide unique information about why women opt out of STEM career paths.”

Diekman isn’t sure why students hold those beliefs about scientific careers, which appear to dismiss science’s immense contributions to human welfare and the fact that research can often be highly collaborative. The burgeoning effort to foster translational research, for example, strongly embodies both those features. “Part of it is likely the kind of images that are available in the culture,” she speculates, such as “the lone scientist with the microscope or a computer and not with another person, whereas when you think about a doctor, you think about a doctor with a patient.” The study examined only students’ impressions and perceptions of various careers, she emphasizes, and not the lived experience of people who have chosen them. But because students must set an academic course long before they gain any such experience, their perceptions, right or wrong, play an enormous role in what they choose.

This concrete and explicit intention to help—rather than simply to advance knowledge or technology—exerts a powerful draw for women students and makes biomedical engineering the most heavily female engineering specialty...

Nor does the belief that science conflicts with communal goals influence only women. “We argue that there [are] average sex differences” in the importance of communal goals “but that it’s really the communal goals that matter” in whether one chooses science, Diekman says. Men who score high in valuing communal goals “show the same pattern” as women with that preference, opting for fields with a perceived communal component such as law, medicine, social work, or education.

Engineering that Helps

The choice made by at least one group of scientifically able women appears to confirm this idea. A technical field with the explicit *raison d’être* of helping people,

biomedical engineering, arose in the past century as a partnership among medical researchers, clinicians, physical scientists, and engineers and has evolved into a separate discipline now taught at engineering schools across the country. The field aims “to improve health,” according to the mission statement of the National Institute of Biomedical Imaging and Bioengineering, the newest institute in the National Institutes of Health. Founded in 2000, it is committed “to integrating the physical and engineering sciences with the life sciences to advance basic research and medical care.”

This concrete and explicit intention to help—rather than simply to advance knowledge or technology—exerts a powerful draw for women students and makes biomedical engineering the most heavily female engineering specialty, according to engineering educators I’ve spoken with recently. The proportion of women at Johns Hopkins University, as at programs across the country, is “well in excess of 40% and sometimes close to 50%,” says JHU engineering dean Nicholas Jones. Dean James Tien of the University of Miami in Florida concurs, adding that other engineering fields generally appear to have a “bad rap” with women students because they lack a “connotation of helping.” Women earn less than one-fifth of bachelor’s degrees in mechanical, electrical, and aerospace engineering and about one-third in chemical engineering.

Bioengineering chair Jennifer West of Rice University in Houston, Texas, says she has heard many women students say they want careers that help people. “All engineering disciplines” can do that, West notes, but the connection is “more apparent to students” in bioengineering. The past century’s great advances in medical diagnosis and treatment—including kidney dialysis, artificial body parts such as lenses and joints, magnetic resonance imaging, and genetic testing—could have happened only with crucial contributions from physical scientists and engineers, who will also be needed for the next generation of health care miracles.

But this message—that physical science, too, is a means of helping—seems to have been missed by many young women with the ability to do the work. If those fields want to attract more women, they need to “make those opportunities to meet communal goals more apparent,” Diekman says. Expanding the notion of the “helping professions” to include those that make discoveries and create technologies that increase human welfare may be a way to encourage more young women to join their ranks.

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Choosing the Best Fit

By David G. Jensen—October 15, 2010

During the good old days—that is, a few years ago—some job seekers managed to line up two or more opportunities before deciding which one to accept. It wasn't an everyday occurrence, but it wasn't rare. And even for those who weren't so lucky, offers were common and frequent enough that strong candidates knew they had a choice. You could take your time and analyze the fit. If it didn't feel right, you knew there was another offer waiting around the corner.



That hasn't been true for a few years now. During these days of economic uncertainty and job-market unease, my columns have focused on the art of looking for work, on increasing the odds of an increasingly rare event: finding a job. But I sense that this is changing.

Maybe it is the optimist in me, but based on the number of management positions our recruiting company and others have filled in the past 6 months, I sense that, downstream, hiring will soon increase in companies large and small. Although no one is shouting with glee yet, it's likely that sunnier days are ahead. The only real question is, how long will it take for them to get here?

Whenever they come, those sunny days will signal to readers that they need to start thinking again about the quality of the fit. If there isn't "personal chemistry" between you and your boss—and you and your company—a job offer can be an offer of entrapment. There's nothing worse than being trapped in a job you don't like, a culture in which you don't fit.

Defining Company Culture and Personal Chemistry

Here's an example of what I mean by "company culture." I tried recruiting a protein chemist with very marketable experience out of a California biotech firm and into a major pharmaceutical company. It felt like a no-brainer, but he would have nothing to do with it. He'd found the perfect match—perfect company culture—with his current employer.

During each lunch break, this fellow takes his surfboard out of a closet and hits the water. That's right, he fits his favorite pastime into his workday. He sure wouldn't be able to do that in the Fortune 500 company I had contacted him about. He would probably also be uncomfortable with the number of white shirts and ties at that company, another indication of a poor fit.

The other critical factor in evaluating an offer (apart from the obvious things like the quality of work, the location, the salary, and the benefits package) is the personal chemistry you have with your prospective boss and colleagues. Whereas company culture refers to your fit on a grand scale, personal chemistry is about how you're likely to get along with the people you will work with every day. Does your working style

complement your boss's working style? Do your future colleagues seem like the kind of people you'd enjoy being around? After all, you'll spend nearly a third of your life with these people for the next few years at least.

It's critical to think about how both elements of the fit feel to you. So, start thinking about the fit on interview day.

Interview Day

If you have a passion as strong and obvious as my surfer friend, you probably can evaluate the fit even before the interview. A company in Des Moines just isn't going to cut it if you want to surf at lunch. However, most of us don't have such rigid requirements. As long as we're given a place to put our work passions to work, we're flexible.

So what should you—an easy-to-work-with, flexible prospective employee—look for? It's simple really: You want to feel good about what you hear and see on interview day, to see and hear things that remind you of what you like about going to work each day.

Here's my number-one suggestion for interview day: Be the real you. If you go into an interview projecting a pumped-up, artificial version of yourself, that's the person who's going to get the offer. Congratulations! You now get to be that person every single day. That's how people end up with 6-month or 1-year stays on their resumé.

Of course, you have to be the best "real you" you can possibly be. People who attract top offers are those who can talk positively about themselves without overstating their abilities or seeming arrogant. There is something about candor in the interviewing process that elicits the same response from the hiring manager. The best candidates know that they have got to do some selling, but they also know that overdoing it can hurt them.

So what should you...look for?
It's simple really: You want to feel good about what you hear and see on interview day, to see and hear things that remind you of what you like about going to work each day.

Questions to Ask

All good candidates bring questions to the interview, questions they've thought about in advance. Some people feel uncomfortable asking questions of their prospective boss. I think that's a shame because I know the boss expects it. You lose points and appear disinterested when you don't ask a few good ones. And by the way, it's fine to refer to your notes.

Here are a few questions about company culture, to be asked of the HR person or any senior staff member:

- **How would you describe the company culture here at ABC Biotech?** (An obvious question, but don't leave without asking it. It's the shortest route to what you need to know.)
- **How does the company communicate with its employees?** Do people at my level in the company generally know what's going on with major decisions and corporate goals? (It's important to know if it's an environment where people at your level are treated like mushrooms—kept in the dark and “fertilized”—or whether they are integrated into the company's big picture.)
- **What is the company's mission statement?** (Another obvious one, but you need to ask. Take this with a grain of salt, as many companies give it lip service only.)
- **What's the corporate view of the quality-assurance team?** (This question applies to whatever part of the company you'd be joining. It's important to know how well the team is thought of by upper management.)

Suggestions for questions about personal-chemistry issues, to be asked of the prospective boss or any peer-level staff member:

- **Tell me about your management style.** (Or, “Tell me about Susan's management style,” if in a meeting with a prospective colleague. This is a critical question that reveals much.)
- **Please share with me some of the secrets for a successful career with ABC Biotech.** What kinds of personal traits and work habits work well in your team? (You're looking for specific examples of things that people do and how they behave that work well with this boss. Don't let him or her get away with gleaming generalities. Everyone is a “hard worker.”)
- **How is work assigned?** Is there a regular process for reviewing progress? How often? (One of the great devils of the industry workplace is the micromanager. Here, you're trying to determine just how “involved” the boss is in your everyday activities.)
- **Is it easy to recognize success in this job?** How will I know when the company thinks I'm doing a good job? (This question ties into the question above and tells you about how the boss views goal setting and performance reviews.)

When reviewing issues like company culture and personal chemistry, go with what you see as well as hear. Although questions and their answers get you part of the way there, on interview day you should keep your eyes open for contradictions between what people are telling you and how things appear. Frowns and warning looks on the faces of lab employees can reveal that everything they're telling you is suspect.

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Expand Your Professional-Skills Training

By Elisabeth Pain—October 1, 2010

As a second-year biology student at the Ecole Normale Supérieure (ENS) de Cachan in France, Cyrielle Barbot was planning on a research career when she felt “the desire to have a project among friends,” she says. So Barbot and Mathieu Moslonka-Lefebvre, another ENS student, created a scientific magazine called *Le Prisme à Idées*. “We went to battle full of innocent enthusiasm, not knowing what it was like,” Barbot says. “We really had to put ourselves in the shoes of an editor, go and canvass professionals, go and sell our project, go and create a layout.” What made the project “cool and very interesting,” she says, “is that we also learned things.”

Barbot's magazine is an example of the kinds of extracurricular initiatives some graduate students take on, in the interest of developing professionally, gaining experience, and having fun. Pursuing such activities, and balancing them with their formal training, allows aspiring scientists to gain skills they wouldn't develop otherwise and expands their professional horizons. Sometimes such projects end up being bridges into new, unplanned careers.

Programs that Foster Initiative

If you decide you want to get involved in some sort of science-related extracurricular activity, you could start from scratch, as Barbot did. But there are simpler ways. “Young scientists really should look for these opportunities, because they do exist. They're just not always that well publicized,” says Jared Silvia, a final-year Ph.D. student in inorganic chemistry at the Massachusetts Institute of Technology (MIT) in Cambridge. In 2005, the American Chemical Society (ACS) Division of Chemical Education launched the Graduate Student Symposium Planning Committee project, which allows chemistry Ph.D. students to organize symposia at ACS national meetings. Silvia took advantage of the program earlier this year, organizing a policy symposium that took place at ACS's August meeting in Boston.

Here's another kind of opportunity: Some professional associations, including the Society for Industrial and Applied Mathematics (SIAM), encourage the establishment of local student chapters. “SIAM gives the whole infrastructure necessary, ... [so] you

only need to gather a group of students that want to do that,” says Hermes Gadêlha, a final-year Ph.D. student in mathematical biology at the University of Oxford in the United Kingdom. But Gadêlha didn’t have to start a chapter, because one already existed at Oxford. He took over the presidency of the Oxford University SIAM Student Chapter last July.

Teamwork

Silvia and nine other Ph.D. students gathered on the MIT campus following an invitation from ACS in the summer of 2008 and formed a committee. They kept the committee’s structure flexible; “anyone could take on more responsibility as they wanted to, and at the same time, if someone became more involved in their research or they were traveling or something had come up in their life, then they could feed some of their responsibilities to the rest of the group,” Silvia says.

At first, the committee held monthly meetings to discuss what had been achieved and to consider new issues. When, about 9 months before showtime, the pace started to pick up, the group held 15-minute, standup meetings every Monday morning. “That worked really well just to keep people moving and motivated,” Silvia says.

Project Management

A key factor in the success of any project is a clear view of the objectives. Barbot and Moslonka-Lefèvre’s vision—of a platform that would allow young scientists from different disciplines to express themselves and exchange information—took shape as they laid the groundwork, forming an association and writing the necessary statutes. Gadêlha and the Oxford SIAM committee planned the agenda of the events they will hold this academic year, including an induction day for newcomers, student seminars, scientific talks by professors, networking events, visits to industry campuses, and an annual conference.

Every effort requires leadership. As a co-chair of the MIT committee, Silvia’s job was to “keep everyone aware of the deadlines, aware of their tasks and responsibilities. Basically just providing reminders, keeping the big picture in mind, and making sure that we were achieving all our goals,” he says.

Money

Such projects also require financial support. After several months of effort, the MIT committee found themselves with eight confirmed speakers but no confirmed funding. They shifted gears, from national funding agencies and corporations to their own institution. “The chair of the department was willing to fund us a few thousand dollars to get us started,” Silvia says. “That was important because, when we had money, then we could go out and make more contacts.”

“Basically, you are trying to sell a product that’s very difficult to quantify and make this product important for them,” says Gadêlha, who had to raise money to offset the costs of the food and drinks they offer at SIAM events and organizing the annual conference. When talking to prospective industrial sponsors, Gadêlha and the Oxford committee have emphasized sponsor benefits such as opportunities to gain exposure and

No matter how valuable the experience, you still have to factor in your supervisor’s opinion. “...try to work out an agreement of some sort to make sure that you can still do the activities you want while understanding that you are responsible for your lab work first and foremost.”

Jared Silvia

be linked to the university. But above all, “most of them ... want the chance to recruit students,” Gadêlha says. Recently, the Oxford chapter secured £4500 (about \$6,110) from two companies, complementing the £300 (about \$407) the national SIAM and the university’s Mathematical Institute each gave them.

Searching for funds forces you to confront some practical issues such as setting up and running a budget. Preparing their first application “forced us to ... anticipate printing expenses, ask and compare quotations, and think about how we were going to finance that,” says Barbot, who won €1800 (about \$2,400) in seed funding from her host institution.

Multitasking

The potential advantages of such activities are offset by a big disadvantage: They take time. So far, Gadêlha has spent about 2 days a month coordinating the chapter, raising funds, organizing events, networking with other SIAM student chapters, and circulating job and funding opportunities to the chapter’s 250 members. Silvia, who joined the MIT committee as a fundraiser, spent 10 hours a week on that task at its peak. As co-chair, he spent about an hour a day on the project during the 6 months leading up to the meeting.

That’s time that could have been spent on class work or research. But had he not been forced to juggle these tasks, Silvia says, “I may not have developed that skill to be able to really home in on an experiment and make sure it’s done right the first time.” He became more efficient and much better at “keeping a diary, keeping a calendar, [and] keeping my thoughts in order,” he adds.

No matter how valuable the experience, you still have to factor in your supervisor’s opinion. Silvia says that he and his supervisor “had the understanding that as long as I was getting my work done in the lab and doing good science, that’s what he cared about most.” So, “go to your supervisor, tell them upfront that you’re doing it if you think it’s going to be an issue, and try to work out an agreement of some sort to make sure that you can still do the activities you want while understanding that you are responsible for your lab work first and foremost,” he advises.

...if you can make the time, you can gain skills—influencing people, budgeting, managing projects—that otherwise would be difficult to acquire until much later in your career.

Broader Horizons

But if you can make the time, you can gain skills—influencing people, budgeting, managing projects—that otherwise would be difficult to acquire until much later in your career. All three young scientists emphasized the pleasure of teamwork. “Especially mathematicians, we work very independently,” Gadêlha says. “It’s a very nice experience just to be part of the group and try to solve different problems all together.”

All three have also seen their professional horizons expand as a result of their volunteer efforts, though in different ways. “Since I want to stay in academia, the chapter is important for my research connections,” Gadêlha says. Managing the student chapter has also given him an opportunity to learn about fundraising in a relaxed and supportive environment. Gadêlha now also feels “much more prepared for an interview for a job.”

As he prepares to write his thesis, Silvia is weighing his professional options. He has become interested in working on applied projects such as energy research—a topic that came up during the symposium planning—either in academia or industry. Silvia is also open to nonresearch careers: His experience on the planning committee “really opened my eyes to the fact that I, as a chemist, have more skills than I realized.”

Barbot’s “career aspirations and what is going on in the association have been evolving side-by-side,” she says. She learned that she enjoys managing projects and bringing people together to work toward a shared goal. And it “is not just by chance that our second issue [covered] urban ecology,” she says. Upon graduating from ENS last June, Barbot abandoned her plans for a research career, training instead for a career as a civil servant in town and country planning.

Barbot expects *Le Prisme à Idées* to continue to influence her professional aspirations as she and her team explore new themes. She says, “This association is about opening your mind, about always having a lot of projects, and saying to yourself, ‘We don’t know how to do it, but we may nonetheless be able to do it.’”

Further Resources

Your home institution and professional association will most likely have some training programs or funding in place to help students run side activities. Below are a few examples, most from national or international organizations. A couple of institution-level programs are included to illustrate what’s often available locally.

- The Information Society for the Information Age supports Student Chapters and offers other volunteer opportunities that could help students learn leadership skills.
- The Society of Economic Geologists Student Chapters
- The Association for Computing Machinery
- The Institute of Electrical and Electronic Engineers Engineering in Medicine and Biology Society Student Chapters or less formal Clubs
- The Society for Advancement of Chicanos and Native Americans in Science Student Chapters
- The European Wildlife Disease Association Student Chapters
- The European Association of Geoscientists & Engineers Student Chapters
- The University of Connecticut Division of Student Affairs offers support to student organizations, including leadership-training programs.
- Boston University’s Student Activities Office offers BU students support and training as well as advice on issues such as fundraising, ethics, and conflict resolution.
- University of North Carolina graduate students may seek funding for student initiatives from the university’s Student Activity Fee Committee, the Student Congress, or the Graduate and Professional Student Federation.

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Moving Up the Academic Ladder

By Laura Bonetta—February 11, 2011

Most individuals who obtain Ph.D.s in the life sciences have set their sights on an academic research career. As this year's *Science Careers* postdoc survey indicated, 61 percent of former postdocs polled and 57 percent of current postdocs hoped to get tenure-track academic positions after completing their postdoctoral studies, and an additional 15 percent of former and 16 percent of current postdocs planned on seeking non-tenure-track research scientist positions.

In reality, only a minority of Ph.D.s actually end up in academic research careers. For those who do, getting that first faculty position is only the first rung up the ladder. In the United States, the academic research path consists of a series of promotions from assistant to associate professor to full professor, followed by subsequent promotions and honors.

While the names of the positions and the degree of job stability associated with each one may vary in different countries, in general, climbing from one step to the next is dependent upon research accomplishments as well as, to varying degrees, other activities including teaching and administrative tasks.

Each researcher finds his or her way of fulfilling the requirements for promotion, but when senior scientists are asked about their approach some common themes emerge.

In the Driver's Seat

While speaking to postdocs and junior faculty attending the Howard Hughes Medical Institute (HHMI) course on laboratory management in 2002, Thomas Cech, HHMI president at the time, likened obtaining a faculty position to getting a driver's license. "All of a sudden you have all of this freedom to turn when you want to turn or to go straight when you want to go straight," he said. "On the other hand, you have to pay for the gas, and you've got some responsibility."

That sense of responsibility took Katerina Venderova by surprise. During her last few months as a postdoc at the University of Ottawa in Canada, before she started a faculty position at the University of the Pacific in California, Venderova was gathering preliminary data, applying for grants, and interviewing prospective graduate students. "I was not prepared for how much responsibility I feel for these bright students' lives," she says. "I was mentoring students as a postdoc but now it's different. I realize that it is not just about me any more."

Hiring the right people is critical when first establishing a research program. To help make the right choices some beginning faculty ask more senior colleagues in their



department to also interview prospective students, suggests Giacomo Cavalli, senior principal investigator at the Institute of Human Genetics in Montpellier, France, who will be assuming its directorship in January.

It's also important to get the lab off on the right track by choosing the right projects to work on. One piece of advice that many beginning faculty receive is to have a risky, but very exciting, project to work on and then something that is a "sure thing."

"I learned this early on from my first postdoc advisor to have some bread and butter, but also some juicy turkey cooking on the side," says Giampietro Schiavo, a cell biologist at Cancer Research UK in London. "I would say that it worked well for me although the difference between the bread and the turkey turned out not to be so huge."

Another piece of advice is to become an expert in a particular area of research. "Identify problem x and become known as one of the best people in the world at tackling it. I was lucky in that I could see a hole in my field of research that no one was doing research in and I chose to work on that," says Robert Allison, pro-vice-chancellor at the University of Sussex, United Kingdom.

"When other researchers are looking for a collaborator or to do a sabbatical somewhere, you want them to come to you because you are the person that does x best."

Tenure Pressure

One of the major hurdles of academic tenure-track positions in the United States and Canada, and the cause of many sleepless nights, is obtaining tenure. A tenure-track spot is typically filled by an assistant professor who will work about five or six years before a formal decision is made on whether tenure will be granted. If tenure is not granted the investigator is asked to leave so that someone else can fill the tenure-track spot. If tenure is granted, the assistant professor is promoted to an associate professorship and, at many institutions, will have a guaranteed salary even if grant funds run out.

Institutions in other countries have adopted systems similar to the one in the United States, but that is not the case everywhere. In France, for example, tenure is awarded after a probation period of about a year almost as a matter of course (barring major problems). The main barrier in French academia is to get into the system and obtain the position of assistant professor. Applicants often have to try for several years to get such a position. But once in the system, the job is secure. "We have a tough evaluation every four years. They can close down the lab if you are not producing, but you would go away with your salary," says Cavalli.

Research First

The criteria for obtaining tenure at institutions that follow a U.S.-type system typically form a three-legged stool: research, teaching, and service. In most research-intensive institutions the research leg of the stool is considerably more substantial than the other two legs. "Research is by far the biggest component," says Linda Walling, professor at the University of California (UC), Riverside and former divisional dean for life sciences. "If you don't have excellence in research you will not remain within the UC system."

The criteria for obtaining tenure at institutions that follow a U.S.-type system typically form a three-legged stool: research, teaching, and service.

To establish excellence, tenure committees will typically look for publications in peer-reviewed journals and letters from senior scientists who can testify to the value of the applicant's research. Having obtained at least one major research grant is also a requirement for tenure at some institutions. "Grants and papers are the standard currency," says Matthew Redinbo, professor and chair of the Department of Chemistry at the University of North Carolina at Chapel Hill.

A good rule of thumb, according to Redinbo, is to first publish a good paper and then obtain a grant. "The grant study section will look more favorably at data that has already been vetted by reviewers and editors," he says. "This will increase your chances of getting the grant." Another piece of advice: "Don't hate the grant writing process," says Redinbo. "It's very clarifying and it makes you think about the important questions to ask to align your ideas and goals. This process sets you up for success."

One of the things a junior faculty member can do to obtain papers and grants—aside from doing stellar research—is to establish a community of colleagues through conferences and collaborations. "These people will be the ones who review your grants and papers," says Redinbo. "And when it comes time to put together your tenure dossier they will be the ones you ask to write letters commenting on your work and personal attributes."

And in today's research environment it is increasingly important to have colleagues and collaborators in different countries. "I believe in international relationships in science. You can do science much faster and in the modern world of big science, the only way to survive is through those relationships," says Paolo Sassone-Corsi, a professor at UC Irvine. To facilitate these types of interactions, Sassone-Corsi co-directs with Emiliana Borrelli an INSERM Unit that brings French students and post-docs to UC Irvine. "Basically it allows students exposure to the American system and American researchers get to learn more about France."

Becoming a Teacher

Although tenure decisions at primarily research institutions are based mostly on publications and grants, more and more universities want faculty members who are also good teachers. "When I first started you just had to be an okay teacher, but today excellence in teaching is more important," says UC Riverside's Walling.

Teaching ability is typically evaluated based on student evaluations as well as assessments from other faculty in the department. Therefore it pays for junior faculty to take any "how to teach" courses that may be offered on campus and/or sit in on the

lectures of colleagues who are known for teaching well. In addition, junior faculty should ask senior colleagues to sit in on their own lectures, not only to obtain feedback but also because "they will be able to write letters about your teaching abilities for your tenure dossier," says Brett Finlay, a professor at the University of British Columbia in Canada.

At liberal arts institutions, such as Wesleyan University in Connecticut, teaching is valued as much as research. "You have to be effective at both, and one way to do that is to integrate your teaching and research activities such that they enrich each other," says Manju Hingorani, an associate professor of molecular biology and biochemistry at Wesleyan.

Doing Service

The third leg of the tenure stool is service, or evidence that a faculty member is willing to work for the betterment of the university, profession, and public at large. Service includes work in departmental and other campus committees, research ethics boards, editorial boards of journals, and grant study sections.

When choosing which committees to serve on, junior faculty should have clear ideas about the time commitment involved. "They should definitely talk to the chair of the department to see how much they should take on," says Walling. It also helps to align one's interests and passions with potential committee work. "Some people are passionate about teaching; they should be on a committee responsible for curriculum development. Other committees are well suited for people who are analytical and detail oriented," says Walling. "If you can leverage what your strengths are, administration is not as painful."

And just as important as finding the right match is learning to say no. "Every young faculty member needs to be engaged, but not overly so," she says. "At the beginning, doing research is the most important thing."

The Growth of Non-Tenure

For the last 30 years, the share of tenured and tenure-track faculty positions in the United States has been declining, while the proportion of non-tenure-track appointments, both full and part time, has continued to grow. In 2007, the number of non-tenure-track, full-time appointments in the United States reached 18.5 percent, up from 13 percent in 1975. During the same time period tenure-track appointments decreased by half, from 20.3 percent in 1975 to 9.9 percent in 2007.

Non-tenure-track positions are often characterized by higher teaching loads and don't provide guaranteed salary like most tenured positions. Instead faculty typically have renewable contracts. "It appealed to me because there is no tenure clock," says Julie Sandell, a professor at Boston University School of Medicine and associate provost for faculty development. "I did not take any longer to rise through the ranks than I would have in a place with tenure, and did not have the added pressure."

Non-tenure-track faculty at Boston University go through the same career path of assistant to full professor as tenure-track faculty. "For promotions the standards are

no different. In the sciences, you have to have external recognition, a lot of teaching, and an independent lab, usually with external funding,” says Sandell.

However, non-tenure-track full-time faculty sometimes feel like second-class citizens in the academic world. To address this and other potential concerns Boston University recently put together a taskforce to examine career tracks of non-tenured faculty. “One of the reasons for the task force was that the non-tenure-track path has grown a bit haphazard and the titles and positions are not well defined across the entire university,” says Tanya Zlateva, taskforce chair and associate dean for academic programs at Boston University Metropolitan College.

Stepping Up

Regardless of the career path or country of employment, continued success in science depends on ongoing research output and hard work. In addition, after obtaining tenure and being promoted to full professors, researchers typically find that responsibilities outside of research, such as writing papers and grants or serving on various committees and boards, increase.

Many faculty members also become chairs of their departments or deans for a particular time period (often three to five years). The positions, researchers say, often show another side of science that can be invigorating and reenergizing.

While many researchers return to the lab full time after stints as administrators, for others administration becomes a career path. After becoming dean at the University of Durham, Allison had to choose between going back to research or remaining in senior administration. “I could have done the job of dean for a three-year term and then gone back to the laboratory. When I was then offered an extension I knew that going back to a mainstream research career would be virtually impossible if I accepted,” he recalls. “For one thing, no matter how hard you try, your productivity as a researcher plummets when you take on the senior administrative duties of a dean. And secondly, though you are still teaching and publishing, colleagues increasingly see you first and foremost as a member of the senior management team and not an academic researcher.”

Academic careers are not for everyone, but for those researchers who decide to go this route, the key is hard work and focusing on the requirements for tenure and promotion at your particular institution. Though the exact path is often unpredictable, proper planning and keeping one's options in mind can help make for a more successful journey.

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Making the Cut in 2011

By David G. Jensen — March 18, 2011

There's a lot of competition today for jobs in the biotech and pharmaceutical industries, and not all of it comes from other academic labs. An increasing fraction of your competition has an unfair advantage: In 2011, record numbers of entry-level jobs—the jobs you're applying for—are going to scientists who already have industry experience.

It's not your father's job market—or your older brother's, for that matter. It is very definitely an employer's market. Companies have access to more talent than they've seen in years for every job opening they announce. Employers can choose whomever they want in a market like this, and scientists with industry experience have big advantages. If you don't have experience, you have to do what you can to offset those advantages.

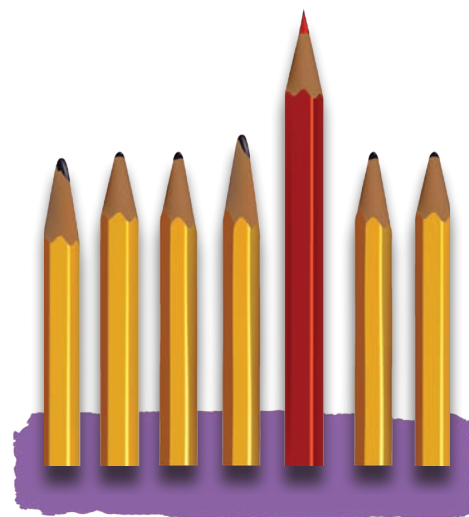
Competing in an Employer's Market

What a bunch of spoiled hiring managers we're going to be left with when this recession ends. The current abundance of interesting, experienced candidates has reinforced a trend we've seen for about a decade: employers searching for very specific skill sets instead of hiring bright people and bringing them up to speed. Converting a molecular biologist into a regulatory affairs specialist would require a training program; it's been years since employers offered that kind of support for new hires. A company isn't going to hire and train you when they can hire a recently laid-off scientist from now-defunct ABC Biotech with exactly the skills they need.

If you're still making decisions about your training, keep this in mind: You are hired for what you did last. That means that if you're choosing a Ph.D. program or a postdoc, you'd better do it carefully. Choose a lab where the work relates directly to your career objective. Choose a lab where the principal investigator is well connected in industry.

If you're already out in the market, the challenge is to present your experience so that it seems just as relevant as your competition's, even if she's already had a year or three in industry. It's hard to compete with people who have already worked in industry. There's less risk in hiring them because they've already passed through the crucial cultural transition and made it to the other side.

But really, their biggest advantage is that they know the job-seeking ropes. What does someone who has been let go from a downsizing company know about the job market that you don't know? Plenty. But if you pay attention, you can compensate.



The Experienced Industry Job Seeker

Your experienced competitor knows how important networking is. She has been managing the networking process since she was searching for her first job several years ago. She knows more people in industry than you do and knows how to identify and contact hiring managers in the companies she'd like to work for.

Here are some other advantages job hunters with industry experience have over most scientists who are making the jump to industry right now:

Industry candidate: In her marketing materials and interview style, she presents herself as a solution to an unstated need, providing a sharp focus on the benefits of hiring her.

Academia-to-industry transferee: Presents her work as if laying it out for a poster session, without relating her experience, acquired skills, or thought processes to the company's area of interest.

Industry candidate: He considers his year or two of industry experience proof that he's had his "ticket punched"; he's an industry insider and acts like it during interviews.

Academia-to-industry transferee: He approaches the huge gulf between academia and industry with trepidation. His uncertainty reinforces the hiring manager's sense that he wouldn't quite fit in.

Industry candidate: He knows that each person he meets with over the course of an interview will have some input in the hiring process. Before interview day, he already has asked the human resources rep to provide a full agenda with names and titles, which he is using to research his interviewers.

Academia-to-industry transferee: He ends up winging it because he's afraid to rock the boat by asking HR to provide an agenda and biosketches.

Industry candidate: Panel interviews, where a number of people conduct the interview around a conference table, don't raise her level of tension because to her it feels much like a project meeting or any other gathering on the job. She confidently shares eye contact with everyone at the table.

Academia-to-industry transferee: She is intimidated by the number of eyes staring back at her. With a deer-in-the-headlights stare, she fixes her eyes on one or two friendly faces.

Avoid this Monster Red Flag

Clearly, these generalizations don't apply to all, but they illustrate common differences between the two types of candidates. I saved the best for last, a red flag that occurs frequently and can be very damaging. It's worth more than a casual mention. "I'm looking for an assistant professorship as well as exploring my options in an alternative career," someone told me recently. Now there's a line that falls flat when you use it in a company interview. They worked hard to get where they are. They never thought of their company as a fallback, or as some kind of alternative. Most importantly, they're not interested in being part of your plan B.

Hiring managers want people who are passionate about the opportunities on *their* side of the academia/industry divide.

Even if you're also still seeking an academic post, when interviewing for an industry job, *that's* the job you want. The industry employer's greatest fear is that you won't make a successful transition to the culture of industry. Why reinforce that fear by talking about an academic job search? Hiring managers want people who are passionate about the opportunities on *their* side of the academia/industry divide.

2011 and Beyond

I look forward to the day, hopefully soon, when those spoiled hiring managers get their comeuppance and entry-level jobs will go back to being entry level. Not that they'll mind: When that happens, the industry will be humming along again, so everyone will be happy. Until then, you need to demonstrate savvy beyond your years of experience.

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