

PROSPECTS

Scientific career renewal

Finding time to explore new research areas can be beneficial for science and scientists, says Peter Fiske.

At a recent conference, I ran into a friend of mine, a talented young professor at a major US research university. She had what so many young scientists think they want: tenure, a research group and all the trappings of academic success. But she confided to me that she was at the conference to network in hopes of leaving academia.

My friend's yearning for a new challenge and her disillusionment with the professional environment that she inhabited are not unusual. Many successful professionals find themselves, at some point in their career, wishing for new challenges and opportunities. Professional restlessness, far from being an indicator of a lack of dedication, is often a sign of intellectual curiosity and a healthy creative drive.

But for scientists and engineers, the need for periodic career renewal comes up against some significant structural and cultural barriers. The relentless pace of scientific research often convinces scientists that they cannot afford even a brief suspension of their research activities. And because concurrent research programmes often have overlapping deadlines, with several collaborators, students and peers, it may seem impossible to disentangle oneself from one's current work. Add to that the myriad professional responsibilities of a typical scientific career — committees, meetings, teaching, proposal writing — and any career diversion could seem catastrophic.

Sabbatical benefits

As a result of this intensification, many scientists and engineers believe that they have few opportunities to explore other areas or intellectually renew themselves. It used to be that scientists in academic research (and in some industries) would have the option of taking a sabbatical. It was an opportunity to leave one's institution, explore different science and technology fields, and create new areas of investigation (see *Nature* **448**, 834–835; 2007). But today, many harried researchers tell me that even if they were able to take a sabbatical, they would use it to divest themselves temporarily of their teaching duties and get caught up on their research activities.

If the chance to examine other scientific realms is absent, scientists can go for years being completely locked into their careers. This can seem highly productive, at least for a while. But without the opportunity to explore, reflect or simply relax, anyone engaged in a creative endeavour such as scientific research runs the risk of intellectual and creative stagnation or worse: burn-out.

The consequences for science are serious



and, I believe, already evident. Because many of the 'metrics' of success in science focus on the number of publications, scientists may resist exposing themselves to other disciplines in which they lack 'scholarly status' because of the slim chance of producing a high-impact publication. As a result, scientific fields and disciplines (and those who inhabit them) can become intellectually isolated and introspective, less likely to make important connections to other disciplines and methodologies.

Ironically, as noted in the recent survey on scientific metrics by *Nature*, administrators and deans don't value numerical 'publication-based' metrics as highly as many scientists think they do (see *Nature* **465**, 860–862; 2010). Letters of support from peers in the field hold significant weight in hiring decisions. Developing the relationships that lead to glowing recommendation letters involves more than just doing good work. It requires scientists to get out of their own labs, travel to other institutions and get to know their peers. Spending time in different establishments — including informal, unstructured time — is the best way to encounter ideas from other disciplines and to stimulate thinking. Furthermore, where you do your science has a considerable effect on your overall scientific productivity. Only by visiting other institutions can you experience different work environments, and perhaps locate the place that makes you the happiest and most productive.

There is ample evidence that periodically exploring new research areas can be intellectually invigorating and scientifically productive. Approaching a new speciality with an outsider's perspective allows you to apply the tools of one field to the problems of another. Henry Bessemer, the inventor of the Bessemer process for making steel, noted that his coming from outside the field of iron smelting (he was an inventor and expert in metal embossing) gave him an immense advantage over others. "I had no fixed ideas,"

he said, "derived from long-established practice to control and bias my mind, and did not suffer from the general belief that whatever is, is right."

Some other professions have recognized the value of moving their 'best and brightest' around to promote intellectual vitality. Military officers rotate through surprisingly diverse professional assignments throughout their careers. A highly trained specialist such as a fighter pilot may be given a year-long assignment to work as a government-liaison or public-affairs representative or attend language training between combat assignments. Some of the highest-performing companies rotate their managers through several assignments to prepare them for senior leadership.

Pursue a broad perspective

Early-career scientists should seek as broad a perspective as possible, because the forces that will push them towards more focused specialization will only increase with time. Graduate students and postdocs should find ways to travel to different research centres and collaborate with researchers outside their host institution (and their principal investigators should embrace this exploration instead of viewing it as a threat to their lab's productivity). And more-established researchers should seize sabbatical openings as an opportunity to explore new areas rather than a way of escaping some of their departmental obligations. Departments, research institutes and funders should create more options for productive scientists in the form of short-term fellowships and rotations.

In his book *Self-Renewal* (W. W. Norton & Company, 1995), former presidential adviser and historian John Gardner explored the roots of decay in societies and individuals. He argued that commonly accepted standards can have an oppressive effect on the creative mind, and that new developments often "originate outside the area of respectable practice". Specialists need not lose the capacity to also function as generalists. Whether or not they do, wrote Gardner, depends on how they are trained and the culture of their work environment.

Scientists must force themselves off the research treadmill periodically if they are to remain creatively stimulated. The culture and bureaucracy of science must encourage them to do so.

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