LETTERS, OPINIONS, AND COMMENTS

Scholarship, funding, and the academic way of life

[The anonymous letter below is being published in the belief that the issues raised merit discussion and review and touch the professional lives of many AMR readers. The author is a young researcher in industry. We respect his wish for anonymity, since knowing his name will not, it seems to us, add anything to the substance being discussed. The responses were solicited by the editor, and several more were received informally, most of them sympathetic to the letter writer's concerns. - Editor]

"Publish or perish" used to be the catch-all phrase that described the academic game of life leading to a tenured position. Today, a better summary for the scientific/engineering academic community is "funding or perish."

A quick glance through the notices of openings for tenure track positions will see the familiar phrase "must develop a funded research program." This means that, at least during the time preceding tenure, the young professor must spend a significant fraction of available time writing proposals, and cultivating contacts at (mainly) government funding agencies.

During this supposed knowledge and reputation-building phase of the career, teaching and scholarship necessarily take second and third place. After all, universities cannot survive on good lectures and well thought out papers on important subjects. Universities are expensive operations that need thousands of fund-raisers, i.e., professors.

In principle, the process of writing a proposal, justifying the necessity of the proposed work and defending it (if given the chance) to one's peers, is beneficial both to the researcher and the community. Given that much academic research is government sponsored, the proposals and justifications must be routed through program managers. These truly dedicated people are in an impossible situation. Each manager must screen hundreds of proposals, review and have refereed dozens of interesting ones, as well as oversee "tens" of ongoing projects, all of this while keeping an eye on future developments that may be of interest and come under his or her charge. Can anyone really do a good job at this? Isn't the likely outcome of such an untenable position the reliance on outside established opinions as to who should and who should not be funded? These outside opinions usually reflect the established researcher, who, as honest as he or she may be, will inevitably have a lifetime of work to defend, and will be unlikely to support proposals for work which could undo his or her own work.

While there is sense in considering the opinion of the expert, there is little sense in being at the mercy of such opinion. This is inevitable as long as the program manager is not truly a colleague, but rather a source of funds for the researcher. Thus, every few years program managers latch onto the latest "sexy" topic and insist that many academic researchers link their work to this latest flurry. As an example, today, if you cannot find chaos in your work, as far as some program managers are concerned you might as well forget about funding in mechanics. Either that or completely change your research perspectives.

Thus, what is the young, untenured, unfunded faculty member to do? There is little time to develop good lectures, to perform scholarly activities, to think over new and daring ideas, to spend time to learn about all the things that must be learned before being bold enough to go out there with proposals for funding, before submitting a paper for review, a paper that should have had a year of work behind it rather than a week of faculty work supported by a year of student effort.

The young academician, however, must take into account such undercurrents regarding what is fashionable research for the next three years. Not to have a couple of three-year grants could mean the end of any hopes for tenure. This is also because funded research is always a higher caliber than unfunded work. It counts more to everybody. In direct connection to funding is the publication of papers. When there were only a handful of journals, in the good old days, the academic researcher could spend much time on scholarly activities leading to a single or 2 substantial papers, perhaps a book. Today, since, as the ridiculous phrase goes: "deans can't read, but they can count and they can weigh," it becomes imperative, in the academic game of life, to publish as though your life depended on the number (not quality) of publications (it does!). Thus, the proliferation of journals. Many publish second rate material in order to justify their existence. A very large fraction of papers are reiterations of previously published work; maybe with 5% new material. Every senior academic wants a journal of his or her own.

Let's assume the best, a proposal gets funded. Now there is a grant to charge. The Dean is happy, the Chairman is happy, the graduate student is happy, and the professor is happy, or is the professor? With funding, research can proceed, can't it? Not really! What may happen, is that the professor outlines some ideas, turns them over to an eager, naive, and most likely foreign-born graduate student to work out and to develop, and then must go to conferences to make contacts, and must begin to write more proposals, for more funding, so that more graduate students can do more research, directed by the professor, of course!

It doesn't seem like much fun. Research (the reason most of us went into this line of work!) is carried out by graduate students. There is occasional input by the professor, who is usually too busy to really follow what the student is doing since the "traveling circus" of conferences and meetings must be attended. Positions must be defended. The quality of work of others must be minimized, your own importance maximized. And so it goes.

Another discouraging trend is NSF's change in funding emphasis from Principal Investigators to Centers of Excellence. The reasons for this change are many. An important one is that makes grant supervision much easier, and transfers the responsibilities of oversight to the academic officials (senior, tenured professors). A major disadvantage is that the secondary allocation of these large grants in small blocks to individual faculty members becomes, at least partially, a political activity. In this environment, the junior faculty member is at a distinct disadvantage, unless he or she is very adept at, and willing to perform, the necessary politics. Ideas tend to take a secondary level of importance in such circumstances.

Finally, it may or may not be obvious that our return on investment is very poor on most research grants. Here is a simple calculation. Given a $100,000 grant, somewhere between 50% and 60% goes to overhead, say 55%. Another say, 25%, goes to student tuition and fellowship. Fifteen percent go to secretarial, travel, telephone and publication costs. That leaves approximately 5% for faculty research. It is worrisome that only 5% of faculty time, based on cost, is used for creative work.
To conclude this letter, a few, perhaps impractical, suggestions follow:

- tenure decisions must be based on quality of work, long-term impact of work, not the number of papers or quantity of funding;
- quality teaching must be rewarded, not awarded lip service;
- breadth and interdisciplinary abilities must be encouraged even though expertise is spread out and thinned; it is much more difficult to address a multi-specialty research area, but this is where the gold is, not in the effort to find the fifth-order correction term to an approximate analysis;
- program managers must become technically involved (by contributing ideas) in a reasonable number of their funded projects, and must oversee fewer of them;
- proposal referees must include competent untenured faculty as well as more industrial researchers;
- journals must impose no page limits, even if this means the publication of fewer papers;
- publication in professional society and other high-quality journals should be encouraged, both to enhance their importance as well as to put out of business the lesser quality journals;
- faculty must be discouraged from overseeing too many doctoral researchers (what is a reasonable number, 5 or less?);
- faculty must be discouraged from publishing too many papers per year; quality is needed, not quantity. (What is a reasonable number? I don’t know, but perhaps an historical study of exceptional past researchers would give us some guidance.)

To conclude, I have outlined some of the problems I see as hampering the quality of research and researchers of academic engineering and scientific departments. There certainly is room for informed disagreement. My suggestions are open for improvement and extension. My hope is that some of these issues can be addressed before more talented people decide that it just isn’t worth the effort and the cost to become a faculty member in this country.

NAME WITHHELD UPON REQUEST

RESPONSE 1:

The letter reiterates many known aspects of academic life. It does so in a controversial way, and it does not seem to contribute any new ideas. The suggestions listed at the end have been followed by many administrators at leading universities for many years.

It is unfortunate the author did not wish to have his name published, on the other hand, if one considers the content of the letter, perhaps it is understandable.

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RESPONSE 2:

Every point raised is valid, and I can give many statistics from here at Stanford in support. The question is, will the situation get worse? Apparently yes, because I can see no tendency for a significant change in the pressures described by the author.

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RESPONSE 3:

As one who has been in the professorial ranks for 25 years, I too am dismayed at the current greater emphasis on funding than on publication, the latter of which is certainly not the best measure for teaching. I have noted that the “best” teachers often appear to be either “easy graders” or ones who do not stress the students. Indeed, the professors who make their students exert themselves are frequently avoided. What really frustrates me is the tendency of students (especially American ones) to emphasize doing what is necessary to get a degree, and not to be seeking knowledge for knowledge’s sake. Many, professors and students alike, take the easy way out, meaning no homework to be graded (professors) or worked (students).

There are too many distractions for students: TV, marriage or whatever, financial problems, etc. The almighty dollar entices them to go directly into industry and not seek an advanced degree. Indeed, if they do, it may not be knowledge that drives them.

I have noted that a student will take a job for Company A over Company B because the salary offered by the former is $32,500 versus $32,000 for the latter, with no real consideration for the future in the company, type of work, etc.

I have seen many examples on my campus where it does not seem to matter to administrators and professors what the quality and nature of the research is, but only how many kilobucks. It appears that research is measured by money, not by contribution, if any. Unfunded research, even appearing in high quality journals, carries very little weight.

The pressure to write proposals to obtain not only research grants, but also equipment, etc. consumes an inordinate amount of professor’s time. Moreover, the chances of obtaining NSF money are about in the range of 1:5 to 1:10. What a waste of good energy! The system is out of whack. Why should I have to write proposals to obtain laboratory equipment for undergraduate instruction? Is this not a responsibility of the institution, or state, or federal government? Imagine what a fraction of one percent of the DOD annual budget would do for laboratory equipment. Our priorities in this country are also out of whack. How many watch some sitcom instead of, say, Newton’s Apple?

My point is that the entire society needs to get back to the basics. Obviously, it starts in the home. If mom and dad don’t have it, how can Jane and Johnny?

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RESPONSE 4:

The letter is well written and I read it with interest, however, I have mixed feelings about it. I think that although there is a valid point to some extent with almost every issue raised, the problems are exaggerated and the general appraisal of the current system should not be as negative as conveyed in this letter.

I personally have a very positive general opinion of the academic system in the United States. It must be recognized that this system has been enormously successful over the last few decades, certainly the most successful in the world. For the money invested, I feel we are getting much more in terms of results than other advanced countries, including Europe and Japan. In my field, and generally in civil engineering, the investment, the investment of research funds in the U.S. per capita is in fact relatively low, much lower than in other countries, yet our results are still very good, in comparison. There is a problem, with the low level of funding in certain fields, not only by the federal government but also by private companies, which spend in this country woefully inadequate amounts in the field of civil engineering which are much less than in countries such as Japan or Germany.

It is true that research funding is at the present perhaps the most important factor in evaluating a faculty member, but I think that in general (there are of course exceptions) this system serves us well. From my experience, I believe the funded research is generally of better quality than the unfunded research, at least in my field. The anonymous referee system practiced by NSF is, I am convinced, the best system available to achieve the goal of giving
funds to the right people. The reviewers of NSF proposals are generally competent, and usually objective. Their evaluations are largely free of cronyism, uninfluenced by personal relations. Such a system can, of course, exist only in such a large country as the U.S., it is impossible in small countries where there exist only a few people in each specialty.

At the beginning of my career I worked within the system of East European countries, where enormous amounts of money are spent for research, in my opinion a much higher proportion of the grand national product than in this country, especially in fields such as civil engineering. Yet the results are meager. Once somebody is accepted as a member of a research institute, he or she receives a rather small but steady flow of funds automatically. Perfunctory plans, proposals are reviewed within the institute where local alliances and animosities, political aspects, and personal favoritism have a major effect on research directions. The main decisions on overall research directions are made by government bureaucrats, and politics is the main factor.

To some extent such unproductive attitudes permeated also the system in Western Europe. I worked there as a researcher and spent much time in various institutes on visiting appointments. They also make very large financial investments in research, in my field I believe considerably larger than ours. However, one might see an institute of, say, thirty people, with several outstanding individuals, but after them a majority of people who produce nothing, some publishing shallow papers which could never get funded in this country, others publishing nothing at all for years at a time, and nevertheless continuing to be promoted draw the same salary according to seniority. This is not something we would want to emulate.

The writer of the anonymous letter advocates various changes, some of which in my opinion would make our system worse and less productive. Our system may be hard on the individual, especially the young faculty member trying to come up. But it does produce results. I believe it would be unjust to give small and equal funding to productive and unproductive researchers.

In agreement with the writer, I also have doubts about the recent shift in emphasis to funding of large centers, but my doubts are of a different nature. One objection is that large centers take away funding from individual investigators elsewhere, who may be more competent and more productive than many members of these large centers. Funneling funds through large centers inevitably means that, in addition to a few outstanding individuals, a number of other researchers get a free ride, people who could not compete alone. There is, of course, the advantage that large interdisciplinary projects can be more easily undertaken in such a manner. However, shifting the decision about funding of individual projects to the level of the center makes the system more susceptible to influence by local politics, infighting and personal alliances, whose impact I remember well from Western Europe.

A senior professor and leading researcher

RESPONSE 5:

The unidentified author of "Scholarship, Funding and the Academic Way of Life" raises several important points about the relationship of academic researchers (or should it be research academics) with their academic institutions, government funding agencies, and their responsibilities to students and society. He (or she) points out the very real challenge of the upward-bound faculty member competing for government research funds in an environment seemingly driven by changing fashions, with an imperfect peer review process, resulting in the neglect of teaching and scholarship. As a government funding agent for nearly a decade and a former researcher funded by several government agencies, I should like to add my perspective.

The letter writer states that "...the process of writing a proposal is beneficial." I believe that it is the most critical and intellectually important part of the whole research process. I formerly worked in the research laboratory of a multi-billion dollar corporation. Although the corporation could readily afford the entire cost of operating the laboratory, their policy was to require each researcher to obtain half his funding from external sources (rather like academic institutions do). They believe that constantly testing themselves in the competitive environment of obtaining government contracts strengthened the quality of their research enterprise.

At AFOSR we are able to fund about one-third of the proposals received. Program managers personally provide specific constructive critical feedback to unsuccessful proposers. Assuming that we are competent, this feedback is, I believe, a significant "value added" that we provide to the research community. I frequently hear from distinguished senior researchers whom we have funded for years to the effect that "that young whippersnapper (Program Manager) had the temerity to criticize my proposal and cut off my funding." Invariably, they will tell me a year or two later "that young whippersnapper was right. Even though it was discomfiting, I have moved into a new area which is very exciting and stimulating." We in the funding agencies can provide part of the external discipline to help researchers overcome the natural human tendency to continue to do what has been successful and comfortable. Research is change, and we are one agent for change.

This brings up the topic of changing research fashions, or what the letter writer refers to as "the latest 'sexy' topic." We in the funding agencies do not create these fashions. They are the new opportunities generated within the research community, not infrequently by young, upward-bound researchers. They generally deserve the attention and interest generated. The danger is that they become so visible that researchers may be reluctant to push other topics they might prefer. I'm not sure how to deal with the natural overemphasis for new research fashions, except to reiterate our policy that we will consider and fund any good idea based on its merits.

The letter writer describes the Government Program Managers as "...dedicated people...in an impossible situation." I disagree that their situation is impossible, but the capabilities and perspective of the Program Manager are key to the success of the whole enterprise. We recruit former researchers with good publication records who can function as colleagues within the research community. In addition to being good researchers, they must demonstrate effective communications skills, especially listening, so that they can learn and assess quality in an area broader than any one researcher usually covers. They read the literature, attend conferences, and pursue other scholarly efforts (teaching, publishing review articles) so that they can truly function as colleagues and provide a valid personal assessment of proposals. When outside reviews are requested, they are used to supplement, not to replace, the Program Manager's judgement.

Buried in the middle of the letter (paragraph 9) is the admission that "Research is the reason most of us went into this line of work." This is a sentiment I hear often at large research universities and from graduate students aspiring to be academics. Is it any wonder that teaching takes second place and that promotion and tenure criteria often pay only lip service to teaching? Universities exist to educate. The best teachers benefit by scholarly research and give their students the benefit of being at the cutting edge. But somehow the tail has come to wag the dog. The 1987 Sigma Xi report on the status of the scientific community entitled A NEW AGENDA FOR SCIENCE clearly articulates this problem as a major chal-
The challenge facing the academic community. As indicated in my opening sentence, shifting the emphasis from academic researcher to research academic would be appropriate.

The letter writer asserts that the "Professor...too busy...to follow what the student is doing since the 'traveling circus' of conferences and meetings must be attended." Why must they all be attended? My impression is that there is usually one really critical meeting per year in each discipline. If we all accept that we have to attend all the meetings, it becomes a self-fulfilling prophesy. And because most organizations require authorship of a paper to justify attendance, the literature becomes further constipated.

Given the state of affairs, perhaps we should advise young faculty members as follows: 1) Teach and be sensitive to your students' needs, 2) Pick an area of research which excites you and a government program manager, 3) Don't go to so many meetings.

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