

How scarce funding shapes young scientists

March 22 2017, by Steven Eastlack

Ask any young science faculty member what keeps them up at night, and you're likely to get the same response every time: funding research. It is no secret that modern scientific research depends on receiving sufficient funding. In fact, grants have become so essential that the entire trajectory of one's career in academic science is tightly linked with the ability to obtain funding. Readers who can identify with this struggle have probably asked themselves how science ended up like this, or more importantly, what, if anything, can be done about it. How to address these questions remains an ongoing conversation among those in the field—one that has become exponentially more complicated in light of recent and alarming reports in the news concerning the future of federal funding for biomedical research.

Eleventh hour blog post renovations

When I first began writing this post, my goal was to address how the current atmosphere of scarce [grant](#) funding is shaping the outlook of scientists in training, for better or worse. However, the day prior to its publishing, major news emerged from Washington in the form of President Trump's [2018 budget proposal](#), which outlined wide-ranging cuts for most federal government agencies. Among the biggest casualties is Health and Human Services (HHS), specifically the NIH division, which will see a \$5.9 billion reduction from its 2017 budget, roughly an 18% decrease.

Without question the news signifies a devastating blow for those in science, specifically biomedical research. But while the proposal is a

clear indicator of the president's priorities, there is some consolation in knowing that the current proposal is merely a blueprint; Congress still has to prepare a formal budget which may not precisely duplicate the proposed cuts. This leaves at least some latitude for scientists to mount opposition to the current budget (ASBMB, for example, [is circulating a petition](#) to voice support for biomedical research funding). In addition, [as NPR notes](#), it is unclear how much of the NIH cuts will directly translate into reductions in grants available for investigators (some of the cuts may target NIH employees). Nevertheless, it seems likely that research funding is destined for some considerable belt-tightening in the coming years.

Given the profound implications of this news for grant-supported research careers, any future discussions of the current state of funding will need to incorporate this development into the mix. Hence, after some late-in-the-game reworking, this post now includes my initial thoughts on the role which grants play in shaping young scientists, with added reference to the impacts of this recent news for the ECR community.

Grant accrual as a barometer for success

Scientists must have a strong track record in funding to survive in academic science; this means that the overriding task of many scientists today is, to put it bluntly, asking for money. Last fall, an [editorial in Vox](#) highlighting the seven greatest challenges facing science today found that, among the 270 scientists surveyed, "a huge money problem" was first overall. Number seven on their list is "[life as a young academic is incredibly stressful](#)" —a problem no doubt related to the scarcity of funding.

Since [demand for grants far outweighs supply](#), only those researchers with proven records of grant awards can expect to obtain faculty jobs

and promotions in academic research. Thus, grant histories are routinely used as the measuring stick to assess the proficiency of a scientist, instead of evaluating them on the quality of their work. Of course, these factors are somewhat intertwined, as good science begets grants. But nevertheless, career success is still disproportionately dependent on this singular consideration.

From the perspective of ECRs, the situation is particularly troubling. We are developing our scientific worldviews in an era that values grantsmanship as much as scholarship, if not more. Grant writing, now virtually an art form, is stressed as the definitive task for achieving success in a science career. It is almost as if the purpose of science is to support grant writing and not the reverse. Despite these concerns, using this metric to gauge scientific aptitude is unlikely to fade. Indeed, the emphasis placed on this factor by promotion and tenure committees will only be intensified by the recent NIH budget reduction, as cash-strapped universities seek to ensure that their research faculty members are able to reliably maintain independent funding support. For up and coming scientists to prosper, the task of soliciting grants is simply the cost of doing business in academic research. However, accepting this reality doesn't mean that the situation can't be improved.

Making the most of the hand you're dealt

In reality, the emphasis placed on grant accrual as a requirement for career success is secondary to the larger problem of inadequate funding supplies. So any attempt to resolve the issue should first address the gap in funding. Simple economics stipulates two approaches to the funding shortfall: increasing the supply or decreasing the demand. Although the former might seem unrealistic in light of the proposal slashing billions of NIH dollars, applying some creativity to the search for funding will turn up sources that are frequently overlooked. For example, there are many [local and state resources](#) that can help subsidize research costs, as well as

[philanthropic organizations and nonprofits](#). These entities may be less well-endowed and less prestigious than federal institute awards, but they are also less competitive. During a funding famine, these organizations can be a lifeline for young researchers trying to make ends meet. Notably, there is [no mention of budget cuts to the NSF](#) as of yet, so scientists whose work might be suited for grant support from NIH as well as NSF might find better luck applying to the latter of these in the future.

On the demand side, the simplest remedy is to lower the effective cost of doing research. If fewer grant dollars are needed to run a lab, more labs can be funded with the same pot, thereby lowering competition for funding. One promising way to lower costs is greater use of data mining. Vast improvements in technology in recent years have enabled the large-scale collection of data in bulk, yielding enormous volumes of information that is generally accessible to investigators at little or no cost. In my personal experience, the [UCSC Genome Browser](#), [OncoPrint](#), and [cBioPortal](#) have all been invaluable resources; I would recommend them to anyone looking to use bioinformatics to supplement their research.

In addition, we can de-escalate competition for funding by continuing to discredit any idea that leaving academia for industry or other fields somehow signifies failure. While this stigma is far less prominent than in the past, most ECRs considering leaving have probably gotten this impression from a mentor or faculty member at some point. Young scientists should feel [free to exit the academic arena](#) if it's not the right fit; remaining won't serve anyone's purposes. The outcome for those remaining in academia will be improved funding rates, following the reduction in numbers of investigators seeking grant support. When alternate career paths are more openly promoted, it makes everyone involved in science better off. Since the upcoming NIH funding cuts will no doubt make this trend even more frequent, it will correspondingly

become more important for academia to view alternate career paths as less taboo.

Expectations for the future of funding science

With more researchers chasing fewer grant dollars, the requirement for ECRs in academia to be adept at obtaining funding while simultaneously overseeing laboratory research and meeting personal and institutional responsibilities will be a formidable task. If balancing all these obligations seems daunting, that's because it is. To quote Matthew McConaughey in HBO's True Detective, "[Life is barely long enough to get good at one thing.](#)" Given these realities, ECRs in [academic research](#) can expect to enter a field where the procurement of funding will continue to be a key factor for career evaluation and promotion, a fact that is highlighted by the recent and dire NIH budget forecast. Regrettably, the ebb and flow of [funding](#) dollars is currently inclined towards its ebb. But even if this is reversed in future years, it will not eliminate the key role which grantsmanship serves in making a successful career in [academic science](#). Therefore, chasing grants will always be a priority. To keep up, future researchers will need to be more resourceful and imaginative than their predecessors. But by sharpening these faculties, acclimating to the ever-changing landscape of [academic research](#) will no doubt prove to be both an attainable and worthwhile task.

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