PNAS OPINION

How can we reform the STEM tenure system for the 21st Century?

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Reforming the tenure system to make it more accountable will require difficult conversations that explore novel ideas. Image credit: Dave Cutler (artist).

On April 19, 2022, Florida Governor Ron DeSantis signed into law an academic tenure reform bill that requires all tenured faculty in Florida to be reviewed by the board of directors every five years (1). A few months ago, Texas Lieutenant Governor Dan Patrick stated that one of his top priorities is to eliminate tenure at all public universities in Texas; he also said that for already-tenured professors, the tenure review cycle would be changed from every six years to every year (1).

Such high-profile political initiatives are a clear indication that the academic tenure system in the United States, a wellspring of outstanding scholars and landmark scientific innovations in the last century, is under growing public scrutiny. It's time to reform the system to ensure continued public trust in the academic enterprise. The scientific community must take these discussions seriously and engage in this important debate. Members of the academy should complete a careful self-evaluation to protect the basic integrity of the tenure system, not let it be weakened by various political processes. This will require difficult conversations that explore novel ideas for reforming the tenure system and making it more accountable. There are some important steps we must take to facilitate this debate—these could include, but are not limited to, discussing the possibility of introducing mandatory mid-career reviews and a tenure expiration date.

Tenure Beginnings

The US academic tenure system that we use today has its roots in the Middle Ages, when powerful kings and church officials in Europe curtailed scientists'

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freedom, preventing them from pursuing new ideas that challenged the norms and beliefs of that time. The church leaders had the power not only to hinder scientific progress but also to harm the well-being of the scientist. One important case in point is the inquisition of Galileo Galilei, who was a professor at the University of Padua. On April 12, 1633, a chief inquisitor appointed by Pope Urban VIII ordered Galileo to turn himself into the Holy Office to begin a trial for holding the belief that the earth revolves around the sun, an idea deemed heretical by the Church. On June 22, 1633, Galileo was suspected of heresy and was sentenced to formal imprisonment for believing in the radical doctrine that the earth moves, and it is also not the center of the universe (2). Although the historic details are complicated, Galileo was essentially persecuted because he explored a radical scientific idea that challenged a system that had been established based on religious dogma.

To safeguard scientists from such political or religious persecution, medieval scholars formed communities that established academic laws. These laws protected the intellectual freedom to pursue scientific research. The modern-day tenure system reflects this model; its primary purpose is to allow scholars to pursue new ideas without the fear of reprisal. In addition, the tenure system is designed to offer scientists the freedom to conduct controversial research without worrying about the possibility of their foes withdrawing their livelihood.

Certainly, it's time for the academic community to proactively debate university tenure system reforms and responsibly address the expectations of the 21st-century public.

Scholars originally designed these academic laws in hopes of protecting researchers who were working on contentious scientific problems, primarily in science, technology, engineering, and mathematics (STEM) fields. Over the years, these medieval laws have evolved to protect scholars in other fields, including sociopolitical and economic fields. The basic premise of the argument for tenure has always been sound; it is about scholars in every field having the freedom to work on controversial ideas to contribute to scholarship in their respective fields.*

Academics developed the tenure system in the United States based on the ideas articulated in a report titled "Declaration of Principles on Academic Freedom and Academic Tenure" (3). Early discussions about tenure were initiated at the 1915 American Association of Colleges and Universities Professors (AACU) meeting when a group of professors decided to address the issue of academic freedom. This group authorized the AACU president to appoint a working committee, in part reacting to a preliminary report prepared earlier by a joint committee of nine faculty members representing the American Economic Association, the American Political Science Association, and the American Sociological Society. The president of AACU eventually appointed a 15-member committee that included 14 professors from socioeconomics, political science, and language departments, and a single science professor (a zoologist from the University of California). Later, representatives of the American Association of University Professors (AAUP) modified the original policy ideas proposed by the AACU committee. The revised document is now known as the 1940 Statement of Principles on Academic Freedom and Tenure (4). The modern-day tenure system is based on the policies outlined in this document.

According to AAUP, between 1940 to 2014, more than 250 scholarly and educational groups endorsed these policies. However, several well-known STEM professional organizations—including the National Academy of Sciences, Engineering, and Medicine, American Physical Society, American Geophysical Union, American Society of Civil Engineering, American Institute of Chemical Engineers, and American Society of Mechanical Engineers (to name a few)—are not on this list (4). It's time that these and other organizations debate and revise the current practice and make it more relevant to 21st--century STEM professionals.

Current Practices and Limitations

As this brief tenure origin story illustrates, promoting academic scholarship is one of the important goals of the tenure system. But what exactly does the word "scholarship" mean in the context of pursuing STEM research? Scholarship can be broadly defined as an activity that updates and extends a research field. To extend a research field, one must know the current as well as the future direction of the field in question to wisely plan various creative activities. Typically, researchers accomplish this by actively participating in professional meetings, publishing journal articles, authoring monographs and textbooks, and creating patents. The pursuit of such scholarly activities differentiates a STEM scholar from a STEM teacher or administrator.

Scholarly professors who are engaged in research also take advantage of the evolving opportunities in their field. This might involve learning new ideas, changing research direction, and/or working on timely problems that impact society. During tenure evaluation (normally completed after five years in almost all public US universities), a peer-review team will rigorously assess the merits of the faculty member's scholarship package to make the tenure recommendation.

Even after obtaining tenure, university administrations expect faculty members to continue their research activities—in fact, they're expected to do so at a much higher level. Tenure is not just about academic freedom; it's about faculty productivity, innovation, the pursuit of new ideas, and the exploration of new fields. Tenure critics point out that one of the shortcomings of the current lifelong tenure model—which typically awards tenure based solely on a researcher's first five-year record—is that it lacks long-term accountability; also, the system simply does not provide sufficient motivation to conduct lifelong research. Although universities typically use other incentives such

*The research methods used, and even the definition of the word "scholarship," can have different connotations in different fields. As a STEM scientist with 25 years of experience (working as a student researcher, consultant, research scientist, and now a professor), my views could be biased. Arguably, my lack of knowledge about other fields limits the scope of this article to tenure issues related to STEM disciplines.

as salary raises and awards/recognitions to encourage faculty to continue research, the current system makes it extremely difficult to revoke tenure even after a faculty member has decided to stop pursuing research.

Tenure Tune-Up

An effective approach to reform the tenure system that would make faculty more accountable is to include a rigorous mid-career review step and a tenure expiration date. When an assistant professor is promoted to an associate professor, she/he could be awarded a tenure contract for 20 years with a precondition of clearing at least one rigorous mid-career post-tenure review.

The tenure system must provide a sufficient degree of intellectual freedom and economic security to make the academic profession attractive to men and women of ability (4). Tenure often attracts bright young scholars who give up high-paying industry jobs to pursue an academic career. These promising scholars deserve a secured position to pursue their innovative research efforts for a reasonably long period. Additional evaluation steps should not be used to impose unnecessary burdens because almost all tenured associate professors go through a rigorous professorship promotion step, which is a natural mid-career evaluation step that typically occurs about five to 10 years after tenure. The only exception is when an associate professor decides against going up for promotion.

But this problem can be easily rectified. If a faculty member decides not to go for promotion, then he/she should be evaluated by a committee to assess their contributions to the university at the end of 10 years. Some of the faculty members who opt to stay as terminal associate professors play a significant role in supporting the teaching and outreach/service missions of the university and, in many cases, they also take on significant administrative responsibilities. These faculty members are important to the general mission of a university. After a rigorous 10-year post-tenure review, these terminal associate professors should also be allowed to complete the full 20-year tenure contract with clear expectations that they would focus on teaching/pedagogy and other administrative services. The mandatory mid-career review step (implemented either through a standard full-professor promotion review or via the proposed 10-year post-tenure review) would be an extremely rigorous step that involves multiple evaluations, including external evaluations. As a result, further evaluations such as the five-year or yearly reviews proposed by Florida and Texas legislators might not be needed.

The basic premise behind the proposed 20-year tenure model is that the society should provide promising young/beginning researchers sufficient freedom and time to work on their novel ideas, but at the same time hold them accountable by introducing a mandatory mid-career review and a tenure expiration date. Under this model, talented beginning professors will get a total of 25 years (which includes the tenure-track time of five years) to build their research and education portfolios. At the end of this period (or at the retirement age, whichever occurs first), everyone's tenure at their home institution will expire.

But there's a natural follow-up question: What happens to the academic freedom of senior professors after this period? I propose that we should raise the bar for these senior scholars by asking the question: Why do these senior professionals need tenure protection? Any protection measure, by definition, should be used to safeguard vulnerable people, such as beginning researchers. Senior faculty will already have a strong research record, and they should be able to stand on their credentials after 25 years of experience. With their vast knowledge and expertise, they should be able to confidently articulate the merits of their controversial ideas and defend themselves well. The expectation should be that these scholars will be sought-after professionals; they will not be worried about job security. The free market should be their protection, not tenure—other institutions should value their experience and offer appropriate leadership positions.

Under these circumstances, when senior researchers change jobs they should, depending on their skills, be able to negotiate their second or third tenure contract for five, 10, or 20 years at a university of their choice, in much the same way successful college football coaches do in the United States. If they want to stay as a professor at the same place beyond their tenure expiry period, their home institution should feel compelled to compete with other universities and industries to retain them by offering an appropriate contract with sufficient reward.

There are several advantages to the proposed 20-year tenure model. First, it reinforces the idea that a tenured faculty member should continue to pursue academic research. Second, it adds additional rigor to the tenure review system by integrating a mandatory, mid-career review step for terminal associate professors. Third, it enhances accountability by including an explicit tenure expiration date for full professors. This model indeed protects the basic integrity of the tenure system by providing sufficient time for bright young talents to build their scholarly academic career. It will also promote a healthy exchange of talents between universities and across the industry by encouraging senior scholars to explore other opportunities beyond their home institution.

Serving as a tenured faculty is a privilege the US academic system has bestowed on young researchers. The expectation is that tenured faculty will be held accountable and remain productive. Senior faculty who willingly accept an expiration date and act on it now (note, any new system will have a grandfathering policy) would send a strong message to skeptics. Their actions will make it clear that members of the academic STEM community are serious about accountability and that they are prepared to critique and improve conventional, long-held practices. Senior faculty should lead this initiative and set a higher moral standard by willingly making the sacrifices necessary to reform the system.

The proposed model is just one of the many possible tenure-reform ideas that academia could explore (5). Certainly, it's time for the academic community to proactively debate university tenure system reforms and responsibly address the expectations of the 21st-century public. If we don't, others, including politicians, will reform the system on our behalf. The sooner we start, the better.

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