

## Future Editorials: The Death of the Proposal

**June 1, 2030.** The U.S. National Science and Engineering Foundation (NSEF) announced today their new funding platform, which no longer allows submission of proposals. Instead, the NSEF will only provide funding to reward especially transformative work on the basis of either accepted papers or those published within the past calendar year. Panels previously held to review proposals will now be asked to review the quality of submitted papers and assess the requested payment for the work. Most programs will have only a single submission window per year and allow only one submission per program. A paper in *ES&T Letters* is reportedly worth \$300,000 (curiously, adjusted to 2014 \$US), while one in *Science* could net \$1 million. Some scientists have been critical of this new approach, saying this suggests a new NSEF motto of “Your risk, high reward”. When questioned about the “one-paper” reimbursement, NSEF officials replied that one research project, which could span several years, is unlikely to produce more than one transformative idea. Thus, getting one paper funded should support several years of research by the corresponding author.

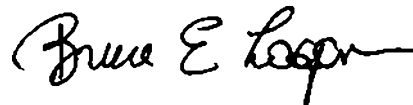
While few are expressing great enthusiasm for this new funding approach, it has been clear for a long time that something had to change. Back in the old days, well before the turn of the century, a proposal stood a one in four chance of being funded, and all you really needed was a “good idea” and some lab space. But as many teaching-oriented universities started to look for ways to bolster income and improve their image, many started hiring research-oriented faculty that could bring in extramural funds. The number of researchers and proposals quickly exploded, while budget constraints at some agencies forced them to discontinue funding external research projects. As a result, by 2020, the chance of getting a proposal funded had declined at the NSEF to less than one in 20. To put together a convincing proposal even then, researchers complained that you needed to have half the work done to submit a convincing proposal. If you were lucky enough to get the proposal funded, you could get money to complete the work, but you still needed to find the time and additional resources to get data for the next proposal. Little by little, the percentage of work and “preliminary data” required to produce a successful proposal steadily increased, resulting in nearly all the work needing to be completed to secure the next grant. At the same time, the chances of getting funded also continued to decrease, resulting in the most recent success rates of 1–3%.

At the same time success rates were dropping, program managers at the NSEF were under increasing pressure to prove to policy makers that public funds were producing discoveries useful to society. As a result, they put greater pressure on their review panels to pick sure winners. Many good scientists increasingly began to refuse to participate in those review panels, making it even more difficult to identify work that would have an impact on the field or society. The proposal reviewers that did participate complained that they were burdened by having to read hundreds of proposals, with little chance of actually seeing the one or two that got funded. This

new NSEF program announced today solved the main problem of no longer asking scientists to predict which proposals will lead to important findings, as the results are already known.

Some universities have expressed outrage at this “pay after” method of research support. However, other universities, particularly those with large endowments, are seeing the advantage of this new business model approach. For this new funding platform, universities assume the risk of development, and then only those successful in producing impactful work get “paid back”. Schools with large endowments can subsidize research by young faculty, and attract older faculty that have consistently proven the value of their work, by offering large “startup” funds that pay for new laboratories and equipment and providing salaries of postdoctoral researchers and faculty while they obtain their results and write papers. They can then send the paper to NSEF, recoup most of their expenses, and move on to the next project using that funding. This approach will likely benefit well-endowed universities as they have the funds to attract the very best and brightest researchers, and therefore, they can find the people most likely to succeed in such a competitive environment.

With this new NSEF approach, it is likely that many universities lacking endowments or substantial state funding will no longer try to function as research-oriented universities, which should eventually improve the funding success rate. This loss of research at universities will no doubt impact their academic standing as well as translate to less innovation and creativity in the U.S. workforce. For many years, the U.S. system of undergraduate and graduate education was the envy of the world, but in recent years, that reputation has eroded. It is hoped that these new NSEF procedures will at least enable some universities to retain their standing as the best in the world, or at least it could help improve the lives of these academic researchers by allowing them to devote more time to research and less time to proposal writing. In the late 2010s, there was still time to make changes that could have avoided the current decline in research universities. But now, that is too late. Ah, if we could only change the past.



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#### Notes

Views expressed in this editorial are those of the author and not necessarily the views of the ACS.

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