

Description

A recent survey was conducted asking 270 scientists what are some of the biggest problems in science. The question asked to the scientists being, “If you could change one thing about how science works today, what would it be and why?” The scientists interviewed ranged in position and years in the scientific field from graduate students, senior professors, laboratory heads, and Fields Medalists. However, the one thing they had in common was that they agreed that their careers are being impacted by negative incentives from outside agencies and forces resulting in bad science.

The basic scientific process is as follows: come up with a question, set up a test for the question, and get an answer for said question. Then to repeat to ensure results and to perfect procedures. However, the 270 scientists stated that they’re forced to prioritize self-preservation over pursuing the best questions and uncovering meaningful truths.

The scientists noted that these days their success is noted by the quality of their research but rather by the amount of grant money they receive, the number of studies they publish, and how they can make their results attractive to the public. Kathryn Bradshaw a graduate student at the University of North Dakota responded to the survey by saying, “I feel torn between asking questions that I know will lead to statistical significance and asking questions that matter.”

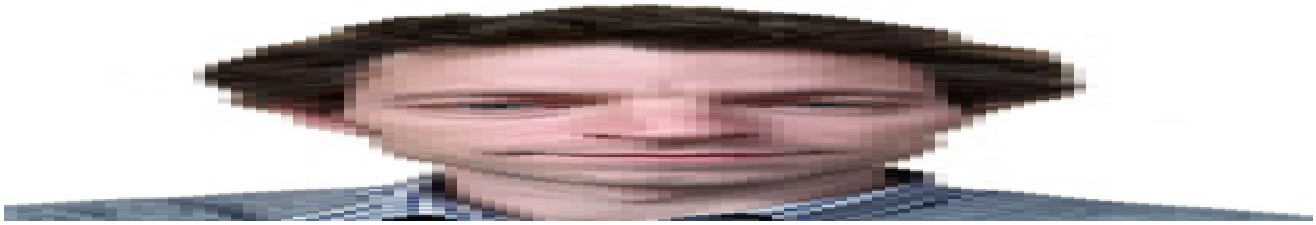
Scientists can often learn more from a failure than success but these days’ studies that fail can mean career death. Scientists are being pushed more and more to publish studies and to stay relevant. Scientist have got caught up in the vicious trap of “publish or perish.” Paul Smaldino, a cognitive science professor at University of California Merced said, “Over time the most successful people will be those who can best exploit the system.”

Now let’s briefly look into the top seven reasons stated by the polled scientists. First academia has a huge money problem, second too many studies are poorly designed because of bad incentives, third replicating results is crucial but rarely done, fourth the peer review system is flawed and broken, fifth too much of science is locked behind paywalls, sixth science is poorly communicated, and lastly seventh life as a young academic is extremely stressful.

Let’s hear the opinion of some of our experts from the industry.

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Our Experts' Opinions on Problems Faced by the Scientific Community



The present glut of underpaid PhDs and post docs, competition has never been greater and publications from early career researchers have never been more numerous.

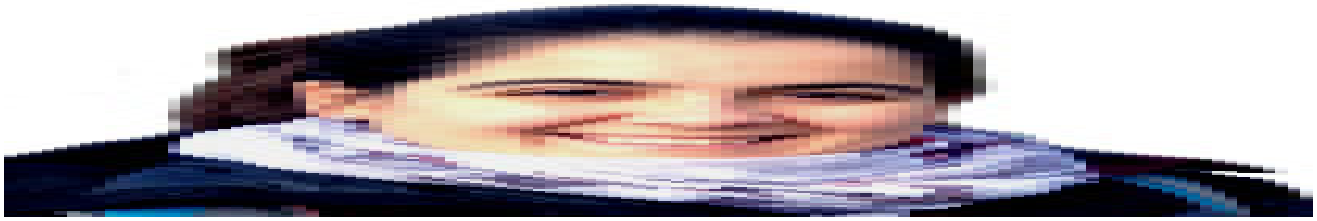
PhD, Cancer (12+ years of Scientific and Medical writing Experience, AU)

Short-term research contracts are often rewarded exclusively on the basis of numbers of publications and impact factors. And because they are short term, they can limit researchers to studies that produce publishable results rapidly. It likely follows that the science produced by permanently employed academics differs from that generated by those whose membership of the scientific community is more precarious. This difference is worth exploring because, due to the present glut of underpaid PhDs and post docs, competition has never been greater and publications from early career researchers have never been more numerous.

In a 2016 article entitled 'The natural selection of bad science', Smaldino and Mcelreath demonstrate the consequences of funding environments that reward career milestones rather than scientific achievements, and suggest the presence of 'selection pressures' for poor methods and safe hypotheses. Such unimaginative work is easy to find. For example, pharmaceutical scientists often compare hundreds of potentially therapeutic chemicals using standard measurements of toxicity and efficacy, and produce tens of publications that differ only in the chemistry of test compounds. And yet, with competitive publication output, these well funded programs of homogenous science can afford rare niches for less predictable hypotheses, allowing some scientists to circumvent the 'perverse incentives' of exclusively meritocratic grant funding. However absent or misguided research funding is, some will find ways to indulge in elegant hypothesis testing, even in an environment of cheap, skilled and dedicated labour in which mundane safe science is encouraged by dwindling career opportunity.

Although public funding for science far exceeds that for the arts and humanities, it remains a privilege to be a scientist and many, like street artists, are compelled by their curiosity to live with the financial insecurity.

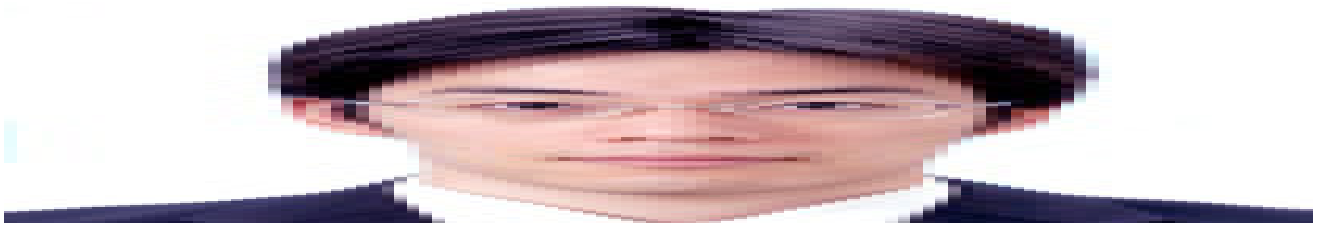
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The issue of poor science communication is easily solvable.

PhD, Biology (12+ years of Scientific and Editing Experience, UK)

Allegedly, the environmental lawyer Gustave Speth once said, “I used to think that the top environmental problems were biodiversity loss, ecosystem collapse, and climate change. I thought that with 30 years of good science we could address these issues. But I was wrong. The top environmental problems are selfishness, greed and apathy…” In my opinion, this summarizes well what are the main issues with science. In fact, most it is down to money. Universities are increasingly managed as businesses, and basic science does not make money (its end-user application does, but that is something universities do not do). Money is behind the pressure to publish as fast as possible, even in detriment of replications or a sound study design. Money reduces research contract length, money requires keeping scientific results beyond a purchase barrier and money, ultimately, launches scientists onto a continuous and highly competitive race for scientific funding. There is some room for a positive thought though; at least the issue of poor science communication is easily solvable. One does not need to be an active scientist to understand science to the detail, and it should be possible to create an ethical code for the science communicator specifying, “I shall not report on science I do not fully understand”.



Science has become less about research and findings and more about popularity.

MS, Information Technology (11+ years of English-Japanese Translation experience, Japan)

One of the biggest problems facing scientists today is that they feel their research isn’t measured by the quality of the questions they pose or the execution of their research but rather by how much grant money they receive, how many studies they publish, or how much they appeal to public interest. Science has become less about research and findings and more about popularity. The challenge today is not just getting funding but maintaining it. Funding strongly affects what scientists study, the results they publish, and the risks they take. This starts a vicious cycle. To receive grants and funding, scientists need to publish work. To publish work, scientists need to have positive results. Scientists therefore choose “safe” research that is easy to publish or may even publish biased results to appeal to their sponsors.

Other problems that are related to or stem from this problem include are (1) bad incentives lead studies

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to be poorly designed, (2) replicating results is crucial but there is a lack of funding to do so, (3) peer reviews are biased or flawed, (4) getting access to scientific results is costly, (5) scientific results are communicated to the general public poorly, and (6) last but not least starting out as a young scientist can be overly stressful and unrewarding.

Even with all of the problems facing science and veteran and young scientists alike, this isn't to say that science is doomed. All this means is that changes must be made to a flawed system so that scientists are able to do research that can make a difference.

Category

1. Career Corner
2. PhDs & Postdocs

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