

A more perilous research scene

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Abstract

I made the remarks herein in a 2023 address to the alumni of Merck KGaA's Innovation Cup – the world's top young scientists. Early-career researchers should be aware that they may see their work attacked, suppressed, or harshly dissected in the non-academic media. They may be personally threatened. The recently heightened danger to researchers is due to their necessary attention to problems with global social impact, such as climate change; to popular backlash against technology industries; vested economic or religious interests; or other reasons examined here. This essay lists the kinds of research that attracts extreme and sometimes violent opposition, the sources of opposition to scientific research, the tactics used to oppose the research, and the ways researchers can protect themselves and harden their research against attack.

Key Words: Research careers; Anti-science; Techlash; Research security; Research quality; Media; Harrassment

1. Introduction

Ladies and gentlemen, good day. Happy as I am to be with you, I must begin my talk on an ominous note – because we come together here at a dangerous time for the world. The four horsemen of the modern apocalypse are: Climate change; pandemic; terrorism and war; and anti-democratic and racist regimes. I'm sure you share my hope that our research may slow these galloping horses.

Yet the research endeavor itself is now more fraught with danger than it has been since the 17th century. I want to devote this hour to exploring why this is so, to identifying the actors who are making research more perilous, to understanding their tactics, and to detailing how we may respond.

2. Research that solves important problems

I hope your research aims to slow or stop the threats to humankind – and not simply to side-step them. I want to emphasize the importance of doing research that clarifies or solves important problems. Research that will be read. Research that will be cited. Research that addresses at least one of the four horsemen, and preferably delves into how they are related to one another. And – for reasons I'll return to throughout this talk – research that holds up under increased scrutiny.

To research well and rigorously today means not only to choose the right question, the right collaborators and the right data, but to avoid loose analyses that lead to questionable results. This means– for example – if you publish provocative inferences from small, non-random samples, you may be encouraging misinterpretation, public criticism, and social polarization, thus harming society rather than benefiting it.

3. Attending to security and self-defense in the research process

And further, in the fraught times in which we live, we must attend to security and self-defense in the research process. Science magazine reports the following,(1) under the title “Scientists [are] under fire – be safe!”

This year [2022], political rifts over the COVID-19 pandemic sparked unprecedented public hostility toward scientists, including online and offline intimidation, protests, and death threats. Those involved in public health suffered the highest profile harassment. . . . Health workers and officials around the world have reported physical and online attacks. Such threats have had a chilling effect on scientists: A Nature survey of 321 researchers found that more than half have had their credibility attacked, and 15% had received death threats.

4. Attacks, threats, and trolls

I mention security in research, then, not just in the sense of ensuring our files don’t get hacked. A professors’ current research on Covid, on the electoral process, on immigration, on race relations, or on product safety may attract vehement opposition and even threats of violence. In fact, it has done so.

A survey of 321 scientists, largely from the United States, the United Kingdom, and Germany, found that 22% were threatened with physical or sexual violence and that 15% received death threats.(2)

Divisive topics: What kinds of research attract haters?

Covid-19	War, Disarmament
Climate Change	Needle Exchanges
Animal research	Tobacco
Economic Development	Artificial Intelligence
Corruption	Germ line editing
Any kind of research that upsets the dominant scientific paradigm	

Who are the haters? We have no time today for examples of all of these, so here are just a couple having to do with pressure or threats from “vested interests”: A key excessive profit-seeker in 2022 was Biogen, which colluded with a corrupted U.S. Food and Drug Administration to gain approval for Aduhelm. This very expensive anti-Alzheimer’s drug was known not to work – but would have enabled Biogen to soak the Medicare system for ultra-big bucks.(3)

A National Cancer Institute consensus panel concluded that evidence did not support routine breast cancer screening of women aged 40 to 49 years. Yet, in response to external pressure from manufacturers and practitioners, the panel revisited the question, resulting in the recommendation that women in their 40s be screened every 1 to 2 years.(4)

Vested interests, driven by financial, political or other motives, may act alone or in combination.(5) Vested interests also may disguise themselves as grass-roots coalitions.(6)

Authoritarian and totalitarian regimes do their best to undermine education. (7) If they succeed, our children and grandchildren will lack scientific knowledge and critical thinking skills, and our countries’ scientific capabilities will languish.

Who might oppose your topical research?

Professional Rivals
Racists
Defenders of the dominant scientific paradigm
Corrupt, hostile, or totalitarian governments
Profits; Varied other vested interests
Those whose personal/family experience contradicts current science
Miscellaneous mischief makers and hackers
Religious fundamentalists
People who misunderstand your position
Corporations defending profits

Classifying the attacks Let's attempt a taxonomy of the oppositions' tactics.

A Geneva nonprofit that monitors these things reports "517 instances of physical violence related to Covid-19, including 10 health workers killed, 24 kidnapped, and 89 injured." Top offenses against Covid researchers are: Personal insults, attacks on professional capabilities, allegations of dishonesty or corruption, wishing harm or death, identity-based insults, complaints to the employer, and cyber attacks. "Only" 18% received actual death threats. Rarer forms of harm included suspicious packages, doxxing, and threats to researchers' families. (8)

Mischief-makers and even hostile governments sow social discord by trying, for example, to discredit sound research on Covid-19 treatments while at the same time touting bogus cures like ivermectin.

Corporate lobbying dollars, previously spent exclusively on legislators, have moved upstream to target the agencies and researchers that provide the science base for policy decisions. The payments seek to politicize or quash objective scientific research, and may use sophisticated and complex strategies. For example, the tobacco industry paid \$156,000 to multiple scientists to write letters and articles "discrediting" a 1993 federal report that linked secondhand smoke to lung cancer. These biased and likely false communications appeared in the *Journal of the American Medical Association* and other prestigious science and business outlets.(9)

5. This is not new

All this isn't new. Galileo, for example, came under indictment by the Christian church for "vehement suspicion of heresy" and was threatened with death in 1633. "To save his life, Galileo publicly renounced his belief that the sun, not the earth, was the center of the universe."(10)

J. Robert Oppenheimer was the key scientist in the project that built the atomic weapon used to end the Pacific War in 1945. Oppenheimer's security clearance was revoked in 1954, due to his suspected sympathy for communism. It was reinstated only posthumously in 2022, as investigations showed Oppenheimer's views had no impact on his job performance or to his loyalty to the United States.

Albert Einstein and Carl Sagan were subjected to years of vehement criticism and smear campaigns relating to their respective theories of relativity and nuclear winter.(11) Iranian nuclear scientists have been assassinated in recent years. Back in World War II, the U.S. sent a major league baseball player to kill German physicist Werner Heisenberg if Heisenberg was getting too close to building an atomic weapon. (He wasn't. If you're not familiar with this strange story, look it up.)

I think of my own student, early in this century, whose thesis topic addressed shady union practices in an African special economic zone. I think of my faculty colleague of the same era who proved that tobacco companies used ammonia to freebase the nicotine in cigarettes, in order to make them more addictive. His published paper resulted in death threats. Both of these gentlemen had to take precautions for their physical safety, the student during data collection, and the professor after publication of his results.

Given this history, why is the research endeavor suddenly now more fraught? Except in totalitarian countries, we no longer have an all-powerful institution like the one that persecuted Galileo. But what do we have? We have social media.

Fighting misinformation Social media has a sibling named socio-political polarization. Both sibs feed on misinformation and on far-flung homophilies that would not be possible without the Internet. These give rise to pundits who've found they can make a living by being contrarian, provocative, and counterfactual.

Opposing these, rather weakly, are fact-checking sites, and the few remaining investigative journalists. We professors, I must say, are generally not good at defending facts in front of the media.

6. Psychological safety

And the social media are expeditious channels for bullying and for other assaults on our psychological safety. Some 40% of all doctoral students suffer from depression or extreme anxiety.(12) Not all of this is from media impacts. Nonetheless, I must ask, if you are a doctoral supervisor, are you a nurturing supervisor? If you are a student needing help, are you asking for help?

Among all members of AAAS, the American Association for Advancement of Science, regardless of research area, 51% said they had suffered harassment sometime in their career, often of an ongoing nature. 20% of all members said that harassment "had caused at least some family or social problems." (13)

More than one quarter of scientists surveyed said they "always" or "usually" were trolled or were personally attacked after speaking out about COVID-19. More than 40% suffered emotional or psychological distress as a result. (14)

Brown studies I mention the condition colloquially called the "brown study," (15) which is common among professors. At one institution, I often saw faculty of the two science departments with which my group shared a hallway, shuffling along slowly, looking at the floor. I didn't even want to say "Good morning," in case it broke their train of thought, and then maybe they wouldn't win the Nobel Prize! (But to my knowledge, they haven't won it anyway.)

The brown study is the exact opposite of the alert situational awareness a controversial researcher should maintain. If you're going to think distractedly, do it in your office! If you like to walk while thinking distractedly, you might ask a student to accompany you and keep a watchful eye out.

In your own institutions We also need to protect ourselves from administrative difficulties with our own universities and our own governments.(16) Remember that security can mean dealing with internal threats as well as external ones.

Within the university, administrators fail to protect us from threats to our jobs from 'woke' students on the political left, and from students and trustees on the political right who confuse hate speech with free speech.

And in America, state legislators are trying to eliminate tenure among faculty of the state universities.(17) If they succeed, it would mean faculty could be fired for saying things about climate, about abortion, about race, about any subject that raises the ire of an anti-intellectual electorate.

Science's survey found that fewer than 10% of harassed COVID-19 researchers received legal (7%), technological (8%), security (5%), or mental health (6%) support from their employers. Respondents said they hoped for—but did not receive—media relations help from university press offices and assistance with screening incoming communications.

In a survey of more than 3000 scientists in the 50 universities that received the most National Institutes of Health funding in 1993, 20% of respondents reported delays of more than 6 months in the publication

of their research results at least once in the previous 3 years to allow for financial interests to slow the dissemination of undesired results.(18) In an extreme example of outside pressure, a young professor was told by her dean that her promotion could be threatened if she attempted to publish her research. (19)

7. International research and research teams

We have seen a quickly rising number of researchers from more and more countries, publishing in international journals, and more and more multi-national research teams. This is a wonderful trend, not least because papers with international author teams tend to be better papers.(20) However, the trend introduces new complications. Most of the complications have to do with geopolitics, export controls, international technology transfer restrictions, the global competition for supremacy in artificial intelligence (21) , and sometimes, research ethics.

Today in America we have to be careful about joint research with Chinese colleagues. Our National Science Foundation offers training in international research security.(22)

Science diplomacy has taken on new dimensions. The continuity of projects can be threatened. Consider for example German universities cancelling MOUs with their counterpart institutions in Russia last year. I myself receive small gifts from scientists in a country that's a rival to the U.S. Surely they don't think these gifts of minimal value can compromise me in any way. I don't think so either – but I sometimes wonder whether the electronic devices contain spyware. It's lucky that as a management researcher I don't know any national security secrets!

Thirteen hundred of our research colleagues from Ukraine have become refugees (23) – not to mention the many torn from their labs to serve in the armed forces. A number of refusenik Russian scientists have fled to Georgia, Cyprus, and elsewhere. We must, on the one hand, try to help them, and on the other hand, wonder whether it could happen to us.

Meanwhile, the critical momentum of scientific progress in their home countries slows or stops - due both to the scattering of Ukrainian and Russian scientists, and to the fact that intellectual centers like Kharkiv, and their inventory of lab equipment and in-process experiments, are now bombed-out heaps of scrap.

8. Politics, in peace and war

Mutual indifference between politicians and scientists ended in 1939, when Einstein and Szilard reluctantly wrote to President Franklin D. Roosevelt about the possibility of an atomic weapon. In 2023, problems are global and urgent – Remember those four horsemen? – and technologies diffuse around the world quickly. We cannot pretend our research is isolated from politics. As I've emphasized, political forces can help you or hurt you as a researcher.

We have to use our personal values, including our political values, to choose the problems that we research. The research itself should be objective, that is, free from value biases. But we inject our values once again, as Einstein did, in deciding where, when and how to communicate and apply our research results.

9. What to do

You are probably asking, Okay, Professor Fred, you've handed us some grim challenges. What should we do about them?

The authorities I've consulted offer advice in four areas: Dealing with the legacy media and social media; dealing with institutions; matters of research integrity; and matters of physical self-defense.

Dealing with media It has become fashionable to promote your research on LinkedIn and Facebook, as well as through your scholarly journals. This is a positive thing; your research is important, and you should disseminate it through multiple channels. However:

- Do not reply to abusive messages on social media. (24)
- Google your own address or phone number, so you'll know how easily others can find you. Try to erase excess personal data.
- Turn off commenting and direct messaging on social-media platforms such as Twitter.
- Generate strong passwords to reduce the risk of accounts being hacked.(25)

- Speaking to the mainstream media can have consequences there and in the social media. One scholar expresses his regrets: "I shouldn't have been rushed, I should not have been glib, and I should have been on home ground and calm." (26) Take training on how to deal with the media.

Scientists who reported higher levels of social media trolling were also most likely to say that this treatment affected their willingness to speak to the media.(27) Bad social media experiences can discourage early career scientists, especially young women and young scholars from minority ethnic backgrounds, from engaging with the media."(28)

Institutional matters As soon as a harassment episode begins, document everything. If it's internal, make copies of as many of the important documents as you can.(29) Obtain advice about taking legal action.

Your employer should remove your contact details from websites at the first sign of harassment. Universities can also provide counseling, including connecting you with a support group of other colleagues who have experienced harassment.(30)

Among scientists who reported harassment to their employer, almost 80% found the employer 'very' or 'somewhat' supportive. Notify campus security officers. In one case, the officers investigated, identified the sender of hate messages, contacted them and warned them to stop.(31)

Support the Humboldt Foundation and other organizations that help place refugee researchers in labs in new countries.(32)

Research integrity The Einstein/Szilard letter was about applying personal values. So be sure you know what your core values are, and how willing you are to carry them forward and defend them.

During the Covid crisis, only 43% of medical journals had policies requiring disclosure of conflicts of interest.(33) Disclose them anyway, wherever you may publish.

Base your research on a substantial n from a well-designed sample. Make sure your data have a credible provenance. Analyze the data rigorously. Draw conclusions carefully. Do not over-state your case.

The press and the public will examine your topical research to a degree that the journal reviewers never did. Make sure your research is unassailable.

Personal physical defense One really colorful email told a Covid origin researcher, "Eat a bat and die, bitch." We are raised to let insults roll off our backs, but a message like this can only make us cringe as we anticipate what the sender might do next.

In the Nature survey, six respondents had been physically attacked. Anthony Fauci, chief medical advisor to the U.S. president during the Covid-19 pandemic, needed a human security detail throughout – that is to say, bodyguards – due to vilification and threats from Covid skeptics, anti-maskers and vaccine refusers. Balance the level of protection you need against the contentiousness of your research topic, and the vituperousness of incoming emails.

In today's disputatious world, if someone attacks you because of your color, ethnicity, or gender, they don't know or care that you're a researcher. Get to a safe place first, and analyze motives later.

30% of Covid researchers reported no harassment. Sounds good – but it means up to 70% were harassed.

10. In conclusion

In addition to casualties among scientific researchers, 67 journalists and media staff were killed in 2022 while performing their duties, according to the International Federation of Journalists.⁽³⁴⁾ The opposition is out there. All I can tell you is, be vigilant, take precautions, be safe, and continue doing your best research.

Despite the dangers to researchers, the scale and urgency of our world's current problems imply that if you do not direct your research toward their amelioration, you are wasting your time. I do not mean to say that you must address the four horsemen head-on. For example, if your research is in organizational development and you help strengthen the agencies that, in turn, attack the threats to humankind, then you have my applause.

Do it bravely! As did Eucharia Oluchi Nwaichi, a Nigerian biochemist who won the 2022 John Maddox Prize "for her tenacity in braving threats... by representatives of an oil company who confiscated her recordings and data."⁽³⁵⁾ Do science bravely.

Thank you everyone.

Afterword Inequality, whether in wealth, income, opportunity, or access to technology, can be a source of social tension, and has even spurred violent revolutions. Through his creative use of entropic statistics, Loet Leydesdorff contributed much to the measurement of inequality. I was privileged to co-author one such paper with him, and to participate with him on conference keynote podia. The above essay is dedicated to his memory.

The author

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Footnotes

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