Forms of fraud in science: Where do they come from?

Several institutions provide definitions of fraud. According to the University of Southern Indiana, “it is a deliberate act (or failure to act) with the intention of obtaining an unauthorised benefit, either for oneself or for the institution, by using deception or false suggestions or suppression of truth or other unethical means, which are believed and relied upon by others”. Succinctly, it is acting deceitfully to obtain a reward. Science fraud, or research fraud, as defined in the Caltech regulations by Goodstein in the 90s, "is a grave form of wrongdoing carried out to deceive others, such as falsifying data, committing plagiarism, or taking credit for someone else's ideas” (Goodstein 1991). Fraud is prevalent across sectors such as business, administration, immigration, academia, and science. Science fraud is on the rise, with fraudulent papers published at a faster rate than the rest of the authentic scientific literature (O’Grady 2025). This essay looks at the forms and sources of fraud in science.

Scientific fraud takes many forms and emanates from diverse areas. In the sciences, fraud can be very difficult to identify due to its subtle forms, the proliferation of scientific literature, the presence of many stakeholders, and the overuse of artificial intelligence (AI). The well-known forms of fraud in science are data falsification or “bluffing”, fabrication or “cooking up”, and plagiarism, also known as the “copy-paste job” or “wrongful appropriation” (Abma 2013; Sethuraman 2021), referred to as the 3 sins of academic misconduct and collectively known as FFP (Sethuraman 2021). Plagiarism occurs when an individual, a group of individuals, or an organisation uses scientific information (ideas, text, images, figures, tables) without giving credit to the source. Another type of plagiarism occurs when an individual copies their own work without citing it. Falsification is the modification or alteration of data and results to suit a hypothesis, desired/expected results, or popular trends. On the other hand, data fabrication or “armchair data”, a term I borrowed from the word armchair journalism, is when a researcher who is supposed to go to the field for data collection or conduct a thorough literature review to summarise data, instead sits in the comfort of his/her room and manufactures data (Sethuraman 2021). The above forms of fraud can include publishing the same scientific work in different languages to count it as two papers, and publishing other people's work without their consent.

An emerging and increasing form of fraud is the unethical use of AI in scientific work. For instance, the use of AI to create scientific content results in unfounded claims and nonexistent citations and references. It also leads to intellectual dishonesty when users fail to disclose that AI has improved their scientific work. For instance, a survey revealed that among 7177

manuscripts submitted to the American Association for Cancer Research (AACR), 36% contained AI-generated text and only 9% disclosed its use (Brainard 2025).

Where does fraud come from is the big question. In science, fraud emanates from its contributors, that is, the actors involved in the production of scientific knowledge. It involves a chain of actors comprising students, junior, mid, and senior researchers, and sometimes publishers. According to O'Grady (2025), it originates from a complex chain involving authors, editors, publishers, journals, and brokers in which paper mills are just a part. Contributors may compromise editors' and publishers' vigilance; in some cases, publishers also enable fraud by failing to follow the review process, as seen in predatory journals. O'Grady (2025) also shows that the actors involved work hand in glove, suggesting that some editors may collect bribes. The aforementioned demonstrates that scientific fraud is complex and interconnected, and therefore calls for particular attention to the scientific literature to sort out the bad apples from the good ones.

Scientific fraud and its sources are well-known in the scientific community and have led to the emergence of new fields, such as sleuthing, to preserve the sciences and protect consumers. The work of sleuths has led to the retraction of many scientific works that involved fraud. Therefore, it calls for strong ethical and moral values from scientists and for deep scrutiny of the scientific literature by students, supervisors, editors, and publishers. It is also important to emphasise the importance of research to participants so they can provide unadulterated information. Increased scrutiny and awareness will greatly reduce fraud in science, eliminate conflicts of interest, and thereby increase trust in the sciences in the era of abundant information.

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