IEEE
CDS NEWSLETTERS

Volume 19, Number 1 ISSN 1550-1914 February 2025

Development of Natural and Artificial Intelligence

The Emperor's New Clothes
and the Nobel Frauds

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1 [AI Crisis] [Judicial Crisis]: The Emperor's New Clothes and the Nobel Frauds

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In the article "Nobel Frauds Rooted in Bureaucracy" [1] we accounted for bureaucracies in academia, media, judiciary, and the Nobel Foundation in the context of Nobel Frauds. To facilitate our understanding of the bureaucracies, here let us use "The Emperor's New Clothes" as a metaphor.

"The Emperor's New Clothes" [2] is a literary folktale written by the Danish author Hans Christian Andersen. The English translation here, among more than 100 translated languages, is by Jean Hersholt, which is available at the Hans Christian Andersen Center of the University of Southern Denmark. In the following, I present the parallels between the folktale and the two Nobel Frauds of 2024 [3].

Many years ago, there was an Emperor so exceedingly fond of new clothes that he spent all his money on being well-dressed. — There was a foundation called the Nobel Foundation so exceedingly fond of funding eye-catching physical and chemistry works to spend its annual money.

He had a coat for every hour of the day. — It announces the awardees every year.

Every day many strangers came to town and among them one day came two swindlers. — Every day many AI papers are published by swindelers among which some form groups of well-known swindelers.

One group is called pattern recognizer (John J. Hopfield and Geoffrey Hinton), and the other group is called protein folder (David Baker, Demis Hassabis, and John Jumper).

They let it be known they were weavers and said they could weave the most magnificent fabrics imaginable. Not only were their colors and patterns unusually fine, but clothes made of this cloth had a wonderful way of becoming invisible to anyone who was unfit for his office or who was unusually stupid. — They let it be known they were researchers, and they said they could do the most accurate predictors imaginable. But they toss dice for each of their predictors, and they show off the luckiest predictor on a pair of validation-and-test sets, but hide predictors that look bad on the validation-and-test sets.

"Those would be just the clothes for me," thought the Emperor. "If I wore them, I would be able to discover which men in my empire are not fit for their posts. And I could tell the wise men from the fools. Yes, I must certainly get some of the stuff woven for me right away." — "The two groups are eye-catching through the media hype", thought the Nobel Foundation. "If I awarded them, I would maintain the reputation of the richest foundation in the world that awards the best teams." Yes, I must certainly award these two groups in 2024.

"I'd like to know how those weavers are getting on with the cloth," the Emperor thought, but he felt slightly uncomfortable when he remembered that those who were unfit for their position would not be able to see the fabric. It couldn't have been that he doubted himself, yet he thought he'd rather send someone else to see how things were going. "I'll send my honest old minister to the weavers," the Emperor decided. "He'll be the best one to tell me how the material looks, for he's a sensible man and no one does his duty better." — "I'd like to know how those persons are getting on with machine learning," The Nobel Foundation thought, but he felt slightly uncomfortable when he remembered that many who were not machine learning experts would not be able to understand the works. It couldn't have been that he doubted himself, yet he thought he'd rather send the Nobel Committee for Physics 2024 and the Nobel Committee for Chemistry 2024 to pick the names in the groups.

The Emperor thought, the whole town knew about the cloth's peculiar power, and all were impatient to find out how stupid their neighbors were. — The Nobel Foundation thought that the whole world knew about the power of machine learning, and all will respect me more if I award machine learning.

So, the honest old minister went to the room where the two swindlers sat working away at their empty looms. "Heaven help me," he thought as his eyes flew wide open, "I can't see anything at all". But he did not say so. — So the Nobel Committee for Physics 2024 and the Nobel Committee for Chemistry 2024 looked through all nominations. "Heaven help me," the committees thought as their eyes flew wide open, "I can't understand at all". But they did not say so.

"Heaven have mercy," he thought. "Can it be that I'm a fool? I'd have never guessed it, and not a soul must know. Am I unfit to be the minister? It would never do to let on that I can't see the cloth." — "Heaven have mercy," the two committees thought. "Can it be that I do not fit the job? I'd have never guessed it, and not a soul must know. It would never do to let on that I can't understand the nominated works."

So off went the Emperor in procession under his splendid canopy. Everyone in the streets and windows said, "Oh, how fine are the Emperor's new clothes! Don't they fit him to perfection? And see his long train!" Nobody would confess that he couldn't see anything, for that would prove him either unfit for his position, or a fool. No costume the Emperor had worn before was ever such a complete success. —

The Nobel Prize in Physics 2024 and the Nobel Prize in Chemistry 2024 were announced to the world. The Nobel Committee for Physics 2024 announced in its “Scientific Background” document, “successfully implement examples of deep and dense networks”. The Nobel Committee for Chemistry 2024 announced in its “Scientific Background” document too, “most monomeric protein structures can now be predicted with high fidelity”.

“But he hasn’t got anything on,” a little child said. — “But the two Nobel Prizes are frauds,” a senior professor Weng said.

“Have you ever heard such innocent prattle?” said its father. And one person whispered to another what the child had said, “He hasn’t anything on. A child says he hasn’t anything on.” “But he hasn’t got anything on!” the whole town cried out at last. — Many authors cried out in the four issues of the IEEE CDS Newsletters 2024. You are reading this article. Will you cry out? Will the worldwide research community cry out?

2 [AI Crisis] Dialogue: The Two Nobel Prizes: Technical and Ethical

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In 2024, the Nobel Prizes in Physics and Chemistry were awarded for research in neural networks. However, in the field of Artificial Intelligence (AI), a different kind of crisis is unfolding—one rooted in the misconduct of "Deep Learning" practices. This crisis, as articulated by Weng in his paper on "Deep Learning" Misconduct (ISAIC 2022) [1], challenges the ethical and scientific integrity of AI research. Weng's paper reveals that the widespread use of Post-Selection in "Deep Learning" projects constitutes a form of scientific misconduct. This practice, which involves selecting the "luckiest" network from multiple trained models, leads to invalid performance metrics and a false sense of generalization. The implications of this misconduct are profound, as it undermines the trustworthiness of AI publications and calls into question the validity of many well-publicized machine learning systems in the field.

At the core of this crisis lies the practice of post-selection, a method widely used in "Deep Learning" projects. Post-Selection involves training multiple neural networks with different parameters and then selecting the "luckiest" network—that fits best in a validation or test set. Although this approach may yield promising but misleading results on paper, it is fundamentally flawed. As Weng argues, this practice is a form of cheating and hiding.

1. Cheating: In deep learning research, cheating occurs when researchers train multiple models but only report the one that performed best on a validation set, without mentioning the others. This creates a false impression of how well the model actually works. The problem is that the reported model is not necessarily better: it just happened to be lucky to fit the validation data. A fair evaluation should test the model on a completely separate dataset (a test set) and report results from multiple training runs to show the full picture. Cheating in deep learning research occurs when researchers selectively report only the best-performing (luckiest) model from multiple training runs, while discarding or failing to disclose the others. This scientific misconduct, whether intentional or due to negligence, amounts to cheating, a civil fraud. See fraud | Wex | US Law | Legal Information Institute.

2. Hiding: Researchers hide the results of less successful networks from their model, hiding the full spectrum of performance of the same model. This lack of transparency undermines the scientific process as it prevents the community from understanding the true variability and reliability of the models. This hidden behavior makes it impossible for independent laboratories to duplicate the reported data.

Weng's Theorem 1 (PGNN Supremacy) illustrates this point clearly. The Pure-Guess Nearest Neighbor (PGNN) method, which randomly guesses labels for validation and test data, can achieve any required error rate (including zero errors) if given enough time and resources. This shows that the nonzero error results reported by "Deep Learning" systems may simply be the product of luck and extensive computational resources, rather than genuine advancements in AI. To understand the graveness of this issue, consider the analogy of a lottery. A lottery winner may claim that their "technique" to select lottery numbers is foolproof because they won once. However, they fail to disclose the thousands of lost tickets that they and many others have purchased. Similarly, in "Deep Learning", the "luckiest" network is presented as evidence of success, while the many failed networks are hidden from view. This practice not only misleads, but also perpetuates a cycle of overconfidence in AI systems that are far less reliable than they appear.

Weng's Theorem 3 (Without Test) drives this point home: any "Deep Learning" method that incorporates evaluation data in the post-selection step is, in fact, operating without a true validation test. This means that the reported performance metrics are misleading and that the models are not trustworthy for real-world applications. The illusion of generalizability is shattered when these models encounter genuinely novel data, where their effectiveness would fail to meet expectations.

Weng emphasizes the ethical duty of researchers to report not just the best-performing network, but also the average, minimum, 25%, 50%, 75%, and maximum errors across all trained networks. This comprehensive reporting would provide a more accurate picture of a model's performance random distribution and its potential for generalization. Without such transparency, the field risks building AI systems that are optimized for past known data but fail in future real-world scenarios. For example, in the case of ImageNet competitions, researchers report only the luckiest network's performance, creating a false impression of superiority. However, as Weng's Pure-Guess Nearest Neighbor (PGNN) method demonstrates, even a simple algorithm can achieve zero errors on validation and test sets if given enough time and resources to exploit post-selection. This raises serious questions about the validity of claims made by "Deep Learning" systems.

The crisis in "Deep Learning" is not just a technical issue; it is an ethical one[2]. The path forward requires a commitment to transparency, rigorous validation, and honest tests that are free from Post-Selection (e.g., managed by an independent laboratory). Researchers must abandon the practice of post-selection and embrace methods that ensure models are truly generalizable. One such approach is conscious learning, as proposed by Weng. Unlike "Deep Learning", which trains multiple networks for each task, conscious learning develops a single network for a lifetime of tasks. This approach avoids the pitfalls of post-selection and focuses on building models that can adapt and generalize across diverse scenarios.

The misconduct of "Deep Learning" is a call to action for the AI community. By addressing these Febuary concerns, we can build AI systems that are not only powerful but also trustworthy. As Weng aptly puts it, "Without a test stage, deep learning is not generalizable and not trustable." In the spirit of the Nobel Prizes, let us strive for a future where AI research is guided by the same principles of integrity, transparency, and rigor that define the best of science. Only then can we ensure that AI systems truly serve humanity, rather than perpetuating illusions of success.

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3 [AI Crisis] Dialogue: They Did Selective Reporting like Past Misconduct in Medicine

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The 2024 Nobel Prizes in Physics and Chemistry gave illusions about transformative progress in their respective fields. This article draws parallels between these illusive progresses and the controversial practice of Post-Selection in machine learning that these two prizes have been criticized for. Post-selection, which includes cherrypicking randomly generated experimental results to fit desired narratives, raises significant ethical concerns, particularly in AI research. Through an analysis of these Nobel Prize-winning works and their methodologies, I argue for greater transparency and rigor in research practices to uphold the integrity of scientific inquiry.

The Nobel Prizes in Physics and Chemistry for 2024 reported misleading performances [1]. The issue of ethical research practices has gained renewed attention. Post-selection, a term used to describe selective reporting of results, is a critical misconduct that undermines the credibility of scientific findings [2]. This Dialogue resonates with Weng's arguments on its implications for research integrity [3]. Drawing analogies to Nobel Prize-winning methodologies, my aim is to highlight the importance of ethical practices in both medical research and emerging technologies such as AI.

Post-Selection distorts the true performance distribution of models and misleads the scientific community. Beyond misrepresenting results, this misconduct wastes research resources, instigates unreliable applications, and leads to erroneous scientific conclusions that persist for years. This practice is problematic because it misrepresents the true performance distribution of a model, leading to unrealistic expectations and unreliable applications [2].

Post-selection has had negative consequences in various real-world demands:

- **Medical Research:** Some drugs that showed promising results under Post-Selection scrutiny failed in larger clinical trials, endangering lives and causing financial losses. A notable example is the case of high-dose chemotherapy for breast cancer, where selective reporting and data fabrication in [4] misled the medical community. Researcher Werner Bezwoda falsely reported highly favorable results, leading to widespread adoption of the treatment. However, independent investigations later discovered severe misconduct, including misclassification of patients and falsified data. As a result, many patients underwent aggressive and ineffective treatments, causing unnecessary harm and financial burdens. Due to the use of Post-Selection which does not generalize well, AI has also failed to predict any entirely new drugs that were previously unknown to humans.

- **Artificial Intelligence:** AI models that used Post-Selection improperly report cherry-picked systems that happened to fit a known validation set, but such systems must fail in real-world applications due to the lack of proper tests.

The 2024 Nobel Prize in Physics was awarded for publications in pattern recognition, specifically for the development of artificial neural networks [1]. However, this work has been scrutinized for significant methodological flaws, including the selective reporting of results. By highlighting only lucky cases and omitting failed attempts, these studies create an illusion of groundbreaking success while masking the actual limitations and variability of their approaches.

The 2024 Nobel Prize in Chemistry was awarded for illusive advancements in solving the protein folding problem using artificial neural networks. These works apparently also suffer from Post-Selection misconduct as claimed by some articles in the earlier issue of the present Newsletters [5, 6].

According to Theorem 2 of [7], the Minimum Mean Square Error (MMSE) estimate of a distribution can only be accurately represented if all samples are considered rather than selectively reporting the best ones. Without independent testing and statistical validation, Post-Selection artificially inflates performance metrics and misrepresents the effectiveness of proposed models.

As Weng notes, Post-Selection misconduct involves:

- Wrongly stating "test" in the absence of a test [2].
- Hiding data that the authors observed but did not report because such data do not look as good as the authors hoped.
- Failing to provide comprehensive metrics, such as averages and percentiles, to describe the performance distribution [3].

To address these issues, researchers must adopt more transparent practices, including:

- The test must not be in another loop of Post-Selection. Thus, such a test should be best done by an independent laboratory [8].
- Clearly stating that not only random initial neuronal weights, but also all hyperparameters that have been tried should be considered in the reported average errors, as these hyperparameters depend on the random validation set [7].
- Avoiding selective reporting by presenting comprehensive data summaries [2].

In summary, in the absence of a disjoint test and the average in the validation dataset, there is no evidence that the pattern recognition problem and the protein folding problem of the two Nobel Prizes have been solved at the reported performance levels. This highlights The two Nobel Prizes have repeated the selective reporting misconduct in past medical research.

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4 [AI Crisis]: Summary for the Dialogues: They Also Agreed

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Here is a summary of the above two AI Crisis dialogues in this issue. Due to the importance of the subjects, as announced in the previous issue, we let these two dialogues [AI Crisis] and [Judicial Crisis] continue to receive new submissions. These two dialogues will continue indefinitely.

In her dialogue titled "The Two Nobel Prizes: Technical and Ethical", Nageeta Kumari wrote "At the core of this crisis lies the practice of post-selection, a method widely used in 'Deep Learning' projects. Post-Selection involves training multiple neural networks with different parameters and then selecting the 'luckiest' network — the one that happens to fit best on a validation or test set. Although this approach may yield promising but misleading results on paper, it is fundamentally flawed." She agreed this practice is a form of cheating and hiding. She further argued "Cheating in deep learning research occurs when researchers selectively report only the best-performing (luckiest) model from multiple training runs while discarding or failing to disclose the others. This scientific misconduct, whether intentional or due to negligence, amounts to cheating, a civil fraud." "The Pure-Guess Nearest Neighbor (PGNN) method, which randomly guesses labels for validation and test data, can achieve any required error rate (including zero errors) if given enough time and resources. This demonstrates that the nonzero error results reported by "Deep Learning" systems may simply be the product of luck and extensive computational resources, rather than genuine advancements in AI. " Kumari was right to state that the AI crisis is not just a technical issue; it is also an ethical one.

The dialogue by Yasamin Mirzababa raised concerns about Post-Selection misconduct in the 2024 Nobel Prizes in Physics and Chemistry, as well as in all research projects and publications. She is right to consider errors of n trained networks as n random samples. Post-Selection selects the so-called "best" sample; however, the MMSE estimate of all these n samples — average — should be reported. She agreed that Post-Selection called the "test" in the absence of a test, hides data that do not look as good as the authors hoped, and fails to report on error distribution. She also discussed selective reporting, a form of Post-Selection, that is well-criticized in medical research. Yasamin Mirzababa wrote "Avoiding selective reporting by presenting comprehensive data summaries." The author has clearly identified both the components of post-selection and the required elements for transparent reporting.

Editor Resources of Taylor & Francis journal editors wrote "Selective reporting bias is when the results of scientific research are deliberately not fully or accurately reported, in order to suppress negative or undesirable findings. The end result is that the findings are not reproducible because they have been skewed by bias during the analysis or writing stages." Lex Bouter, Professor of Methodology and Integrity, Vrije Universiteit, said during the Amsterdam Scholarly Summit, on 2 July, 2019, "Selective reporting is important and many people still ignore the issue. And it is one of the root causes of the current replicability crisis that we are facing not only in biomedical sciences, in the social sciences, but it is clear that it is also happening in other types of science."

Should the five pending awardees be honest with the public and respond to the calls for help from the three students in the last issue of this newsletter (Abhiram T. Veettil, Houmehr Malekzadegan, and Jiaxuan (Jackson) Gong) and the two female authors in this issue (Nageeta Kumari and Yasamin Mirzabab)?

I invite the reader to continuously give his views, comments, and suggestions. Send a one-page or two-page paper as a dialogue to me at juyang.weng@gmail.com with a CC to Prof. Dongshu Wang at wangdongshu@zzu.edu.cn by March 30, 2025, for Issue 2 of Vol. 19, 2025.

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5 The Piltdown Man Hoax

Image Source:https://www.geolsoc.org.uk/Library-and-Information-Services/Library-Events/F-is-for-Fake

The Piltdown Man Hoax is one of the most famous forgery events in the history of science in the early 20th century, having a profound impact on the field of human evolution research. This hoax originated in the United Kingdom, and the key figure in the event was Charles Dawson, who claimed to have discovered a significant ancient human fossil in 1912 in the village of Piltdown in southeast England.

The Piltdown Man fossil included part of a skull and an orangutan jawbone. The skull was particularly striking, which showed a relatively modern human brain size, while the jaw showed ape-like features. Dawson and his collaborators claimed that this discovery proved that the human evolutionary process gradually transitioned from an ape-like species to an early human with a larger brain capacity. This discovery was highly attractive to the scientific community at the time, as it seemed to fill the missing link in the evolutionary timeline of humans, particularly in the transition from apes to humans, revealing an "intermediate form" of early humans.

Although the Piltdown Man fossil was highly praised by many scholars and even became a cornerstone in anthropology, it did not raise enough skepticism within the scientific community at the time. It was not until 1953 that scientists, using new techniques such as fluoride testing, revealed the true nature of the fossil. These tests showed that the Piltdown Man skull did not belong to an ancient human but was a combination of a modern human skull and an orangutan jawbone. More importantly, the fossils had been artificially stained to fake their age. Ultimately, the scientific community confirmed that this was a carefully planned forgery.

The Piltdown Man hoax not only misled a large number of scholars and scientists at the time, but also had a profound impact on archaeology, paleoanthropology, and the broader scientific community. First, the event exposed major flaws in the oversight and verification processes within the fields of archaeology and anthropology, especially in the absence of modern technological methods, where the scientific community was too quick to trust individual scholars claiming major discoveries. Secondly, the Piltdown Man hoax became a cautionary tale in the history of science, reminding the scientific community to remain cautious when faced with groundbreaking discoveries and to rely on multiple lines of evidence and modern techniques for verification. Furthermore, this event prompted the widespread adoption of stricter methods for verifying fossils and other archaeological findings, leading to more transparent and systematic progress in scientific research.

The revelation of the Piltdown Man hoax marked the beginning of a more rigorous scientific era in modern anthropology, becoming an important milestone for the scientific community in terms of reflection and self-correction.

6 The Hwang Woo-Suk Stem Cell Scandal

Image Source:https://www.wsj.com/articles/SB113466444518223545

In 2004 and 2005, Hwang Woo-suk published research in Science and other prestigious international journals, claiming that he had successfully cloned human embryos and extracted stem cells with therapeutic potential from them. He also claimed to have used these stem cells to repair organs in experimental animals. This research was considered a breakthrough in stem cell technology, especially in the field of stem cell therapy, and garnered widespread attention throughout the world, receiving recognition from the scientific community, media and the public.

However, by the end of 2005, the reliability of Hwang Woo-suk's research began to be questioned. The South Korean scientific community and international scholars conducted a thorough investigation into his data and eventually discovered his fraudulent actions. The key evidence was that some of the experimental data and images had clear signs of falsification. Further investigation revealed that Hwang had not successfully cloned human embryos as claimed, but had used existing embryos and had fabricated the stem cell extraction process.

Hwang not only tampered with the experimental data, but also violated ethical standards in his experimental procedures. He failed to properly inform the research subjects and did not obtain the necessary ethical approvals, which meant that his research was not only academically fraudulent but also violated multiple principles of biological ethics.

The Hwang Woo-suk stem cell scandal had a significant negative impact on the global stem cell research field. First, his fraudulent research severely undermined public trust in stem cell technology, particularly in human embryonic stem cell research. Given the perceived medical significance of his work, many considered this incident to be a major scandal in the scientific community, exposing the potential manipulation and misconduct that can occur in scientific research.

Second, the scandal sparked widespread discussions about the ethics of stem cell research, especially research involving human embryos. The scientific community began to place greater emphasis on experimental ethics and oversight, leading to strengthened ethical review processes in the field.

Furthermore, the incident revealed potential gaps in the peer review and research examination processes within the scientific community, prompting academic journals and institutions to adopt stricter verification of research results. Although the scandal significantly damaged the reputation of the field, it also accelerated the standardization of global stem cell research and promoted more transparent and rigorous research procedures.

7 The Robert Millikan "Oil Drop Experiment" Controversy

Image Source: https://en.wikipedia.org/wiki/Oil_drop_experiment

Robert Millikan, a renowned experimental physicist of the early 20th century, won the Nobel Prize in Physics in 1923 for his work in the "oil drop experiment". Through this experiment, Millikan successfully determined the size of the electron's charge, making a significant contribution to the development of electron theory and electromagnetism. The principle of the oil drop experiment involved observing the behavior of charged oil droplets under the influence of an electric field to precisely measure the electron's charge.

However, Millikan's oil drop experiment also sparked controversy, particularly concerning the selection and handling of experimental data. In his research, Millikan did not disclose all of his experimental data, but instead selectively used those results that aligned with his theoretical expectations. He chose data that supported the precise measurement of the electron's charge while ignoring data that contradicted his findings. This practice raised questions in the academic community regarding the scientific integrity and validity of his data processing methods.

Furthermore, Millikan did not sufficiently account for experimental errors, leading some scholars to believe that his results might be biased. Despite this, the oil drop experiment is still regarded as a pivotal experiment in the history of physics. In particular, in the context of electron theory, Millikan's measurements provided important experimental evidence for the fundamental properties of electrons.

The controversy surrounding the oil drop experiment had far-reaching consequences. First, Millikan's data processing methods led to reflections on research ethics and data transparency, encouraging the scientific community to put more emphasis on the completeness and openness of experimental data. Secondly, the incident sparked a broader ethical debate about selective reporting of experimental results by scientists, which influenced future standards for data management and handling in scientific research.

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