ЕВРОПЕЙСКИ СЪЮЗ
ЕВРОПЕЙСКИ СТРУКТУРНИ И ИНВЕСТИЦИОННИ ФОНДОВЕ

"Кариерно развитие на младия учен"

ОПЕРАТИВНА ПРОГРАМА
НАУКА И ОБРАЗОВАНИЕ ЗА ИНТЕЛИГЕНТЕН РАСТЕЖ

THE PHILOSOPHY OF FAKE SCIENCE

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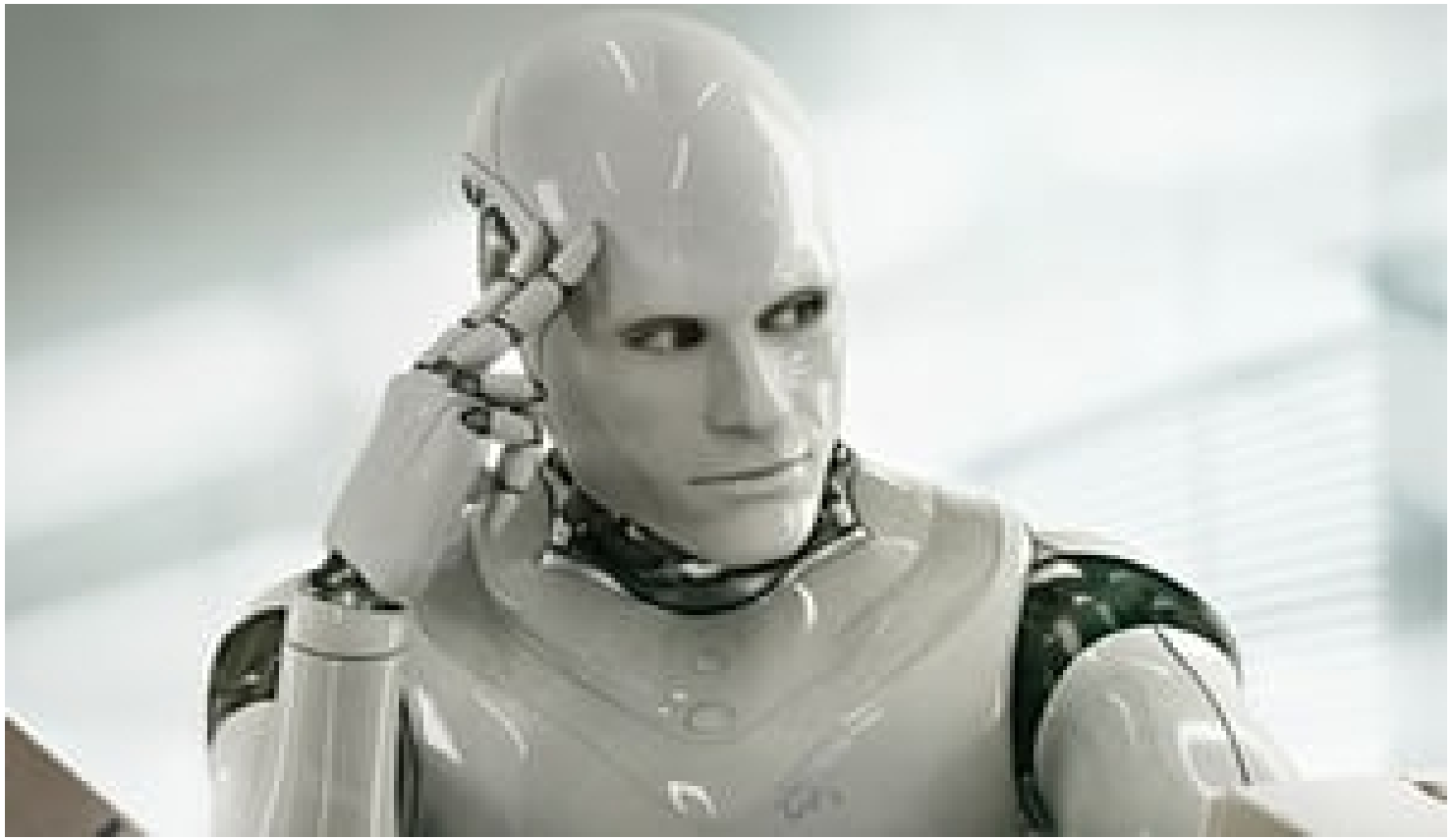
Проект BG05M2OP001-2.009-0028 "Постигане на оптимална среда за обучение, научни изследвания, иновации и устойчиво развитие на човешкия капитал в сферата на химическите науки: Адаптиране на образованието днес за утрешния ден", финансиран от Оперативна програма „Наука и образование за интелигентен растеж“, съфинансирана от Европейския съюз чрез Европейските структурни и инвестиционни фондове.

Why not writing scientific papers and theses ?



On the fast track

- The creators of the automatic nonsense generator, Jeremy Stribling, Dan Aguayo and Maxwell Krohn, have made the SCIgen program free to download. And scientists have been using it as a fast career tool. As reported in NATURE , French researcher Cyril Labbé revealed that 16 gobbledygook papers created by SCIgen had been used by German academic publisher Springer. More than 100 more fake SCIgen papers were published by the US Institute of Electrical and Electronic Engineers (IEEE). Both organisations have now taken steps to remove the papers.

Huge amount ot terms for “science of delusions”

- Pseudoscience
- Fake science
- Scandalazing science
- Erraratic science
- False science
- Parascience

Many terms but what is the point?

- The modern society is in a hurry. It is career-oriented groups of humans with different interest and different abilities to follow the trends in science, art, culture, business, education, human relations and progressive thinking. The movement on the high speed track only causes many problems, incidents, wrong decisions and vicious actions. The fake science is only one of the many cases of lack of correlation between reality and good intentions (let's remember that road to hell is paved by good intentions).

How does the scientific fraud work?

- Manipulation of results
- Fabrication of results
- Plagiarism
- Stealing the work of other researchers
- Delay of the assessment of the review of the study of a rival in order to use his achievements

More options to this issue

- Citations supposed to be credits for the past research achievements are used in large number pretending that it improves the quality of own research (requirements for more “recent year references”)
- Not citing previous studies at all

The Hwang Woo – Suk case

Cloning human cells or fraud…

- Hwang admitted in January 2006 to falsifying data, while maintaining that he had the ability to do what he had claimed. In South Korea, scientific fraud would be illegal only if Hwang had used fraudulent data to gain grants. Prosecutors argued that he duped two companies, SK Group and NongHyup, into supplying research funds. But according to media reports, the court rejected the allegations on the grounds that the firms provided money without expecting to benefit.
- The court did, however, find Hwang guilty of buying human eggs in violation of the country's bioethics law and of embezzling 830 million won (US$700,000) of government money.

Comments to the case

- Researcher Ryuzo Torii of the Shiga University of Medical Science in Japan used large amounts of grant money, time and monkey eggs trying to reproduce Hwang's technique in non-human primates in 2004 and 2005. He says that forgiving Hwang and recognizing him as a researcher would be "a mistake".

In the name of glory and fast career

- Vanity is not unknown complex even for scientists considered to be modest, calm and devoted mainly to models, theories, calculations, experiments and instruments
- Fast advance in career is often a driving force in many individual scientific souls
- If vanity and careerism are at hand, nothing human remains taboo for scientists

Roads to fast advance

- Open access epics
- Keeping a friendly environment
- Creating sense of trust and competence
- Avoid peer reviews and independent verification; do not offer original results for verification
- Acknowledge grants but not scientific help

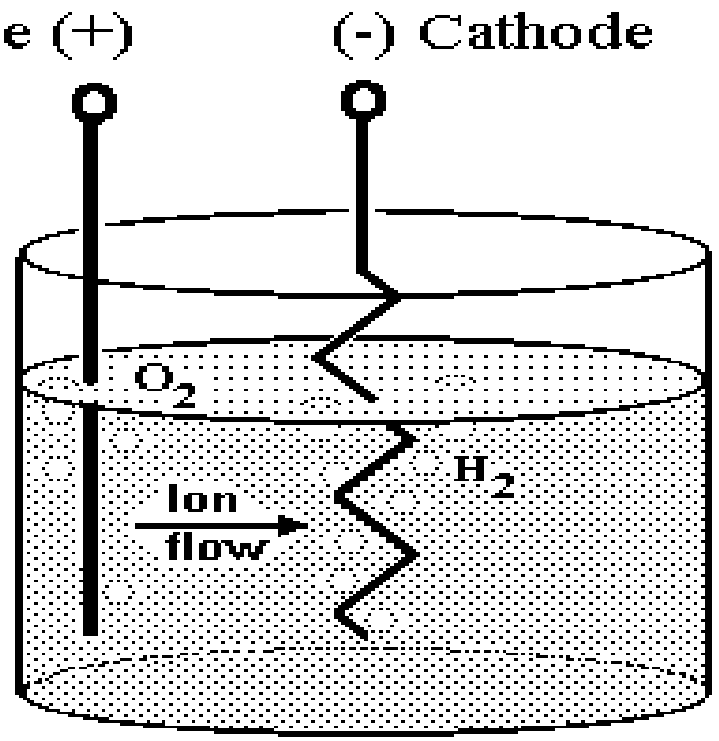
“Case studies” or fraud protocols

- A German physicist, Jan Hendrik Schön (1970-), briefly rose to a position of prominence after seemingly having a series of astonishing breakthroughs in several experiments using semiconductors. These "breakthroughs" were later discovered to be fraudulent, but not before he had received the 2001 Otto-Klung-Weberbank Prize for Physics in 2001, the 2001 Braunschweig Prize and the 2002 Outstanding Young Investigator Award of the Materials Research Society. All were subsequently rescinded.

The Cold Fusion Incident

- Fusion power has been heralded as the solution to our future power needs. After all, it promises to provide a nearly limitless supply of energy with minimal environmental impact. The current problem, though, is that it takes a tremendous amount of energy to fuse together nuclei.
- So, when Stanley Pons and Martin Fleischmann announced to a hungry scientific world that they'd discovered cold fusion in 1989 (a process that supposedly used much less energy), the duo were welcomed with splashy headlines.
- Other scientists were dubious, and when Pons and Fleischmann withdrew their paper from *Nature* magazine and refused to answer questions, charges of fraud were made. Pons and Fleischmann never gave enough details of the experiment to allow others to replicate it, and more than 10 years later no one has been able to replicate their results.
- There are still scientists who believe Pons and Fleischmann were on to something, but the premature claims of cold fusion cast such doubt on these two researchers that they were doomed to ignominy.

Ponce and Fleischmann's cell



A TYPICAL COLD FUSION CELL

The cathode is palladium in a typical heavy water cell and nickel in a typical light water cell. The CETI cell contains layers of nickel palladuim and copper.

The electrolyte is light or heavy water and a salt. The salt is usually lithium sulfate.

Piltdown Man Saga

- The big-brained, ape-jawed Piltdown Man was hailed as a major missing link in human evolution when he was discovered in a gravel pit outside a small U.K. village in 1912. The find set the pace for evolutionary research for decades and established the United Kingdom as an important site in human evolution. The only problem? Piltdown Man turned out to be one of the most famous frauds in scientific history—a human cranium paired with an orangutan's jaw and teeth. Now, scientists think they've figured out once and for all that a single hoaxer was responsible, not a duplicitous cabal.

More of the Piltdown case

- The saga of Piltdown started in 1907. That year, a sand mine worker in Germany discovered the jaw bone of ***Homo heidelbergensis***—a 200,000-to-600,000-year-old hominin now recognized as a likely common ancestor to both modern humans and Neandertals. The find, compounded by rising national tensions that would eventually lead to World War I, sparked something of an inferiority complex among U.K. naturalists. So it seemed fortuitous when, 5 years later, Charles Dawson, a professional lawyer and amateur fossil hunter in Sussex, U.K. (now East Sussex, U.K.), wrote to his friend, paleontologist Sir Arthur Smith Woodward, announcing that he had uncovered a “thick portion of a human(?) skull which will rival *H.heidelbergensis* in solidity” near the Sussex village of Piltdown.

The missing link

- Smith Woodward and Dawson jointly presented their findings to the Geological Society of London in 1912. From their first excavation, they claimed to have discovered several pieces of a humanlike skull, an apelike mandible, some worn molar teeth, stone tools, and fossilized animals. Excavations over the following 2 years by the team revealed canine teeth that were somewhere in between a human's and an ape's in size. Based on the bones' color and the fossilized animals surrounding them, Dawson and Smith Woodward speculated that the individual lived some 500,000 years ago. The U.K. human evolution research community enthusiastically embraced *Eoanthropus dawsoni*, better known as Piltdown Man. Its large braincase and apelike jaw and teeth were exactly what these scientists expected to find from a "missing link."

Proud British scientists

The famous skull of Piltdown

- Charles Dawson's finding

Continuation of the story

- The hoax came to light in 1953 when scientists at the University of Oxford in the United Kingdom, using the then-new technique of fluorine dating—which relies on the fact that older bones absorb more fluoride from groundwater over time—revealed that Piltdown Man's bones were not all the same age. Further analysis revealed they were an amalgam of carefully carved and stained human and ape bones.
- The potential perpetrators included Dawson and Smith Woodward, naturally, but also Pierre Teilhard de Chardin, a French Jesuit priest who assisted the excavation, and Martin Hinton, a volunteer who worked with Smith Woodward, among others. Even Sherlock Holmes creator Sir Arthur Conan Doyle was considered. So whodunit?

The truth

- Isabelle De Groote, a paleoanthropologist at Liverpool John Moores University in the United Kingdom, began looking into the question in 2009, applying modern scanning technology and DNA analysis to the original materials. She and colleagues compared computer tomography (CT) scans of the mandible and teeth to known ape specimens and concluded that all these pieces originated from an orangutan. DNA sequencing of the teeth suggested they all came from the *same* orangutan, which De Groote suspects the forger or forgers might have obtained from a curiosities shop.

The Grey Area

- The problem is defining what fraud is and what is honest. Scientists, like anybody, can make genuine mistakes, or be a little eager to see a correlation amongst the randomness.
- This is not really fraud, but experimental error, and it would be unfair to be overly critical about this process. Unfortunately, a scientist's wages and career are possibly on the line unless they produce results, and this crosses the line.
- Another example of a grey area is in images. Scientists in cell biology, for example, would often use false color in an image to enhance areas, making it easier for their results to be seen.
- With the increasing sophistication of graphics programs, there have been implications that this image enhancement has actually been used to manipulate images and show what is not there. Many scientific bodies now advise against enhancing images, because it leaves the researcher open to accusations.

Nothing new under the Sun

- The Cardiff Giant , 1869

The petrified giant

- Manmade sculpture – by George Hull - a tobacco seller from New York (1869);
- “Proof” of giants living on Earth thousands of years ago
- “Excavated” near Cardiff, New York, USA
- Attraction in exhibitions and circus arena (25 cents)

The plastic power of the organic world

- Johan Beringer, 1726

Another forgery with petrified artefacts

- The idea of Johann Beringer was to demonstrate that stones preserve in fascinating way organic fossils – birds, wasps, insects – especially stones from Morroco
- An “scientific” description of an ancient and unknown world followed…

The Tasaday tribe

- The Philippine Wonder, 1983

The real story

- In 1971, a Philippine government minister (Manuel Elizalde) discovered a small stone age tribe living in isolation on the island of Mindanao. This tribe, called the Tasaday, spoke a strange language, used stone tools, and exhibited other stone-age attributes. Their discovery made television headlines, the cover of National Geographic, and was the subject of a bestselling book. When anthropologists tried to get a better look at the tribe, President Marcos declared the land a reserve and made it off-limits to all visitors.
- When Marcos was deposed in 1986, two journalists visited the site and found that the Tasaday in fact lived in houses, traded with the local farmers, wore jeans and t-shirts and spoke a modern local dialect. The Tasadays explained that they had moved in the caves and behaved in a stone-age manner because of pressure from Elizalde. Elizalde had fled the country in 1983 with millions of dollars he had stolen from a foundation set up to protect the Tasaday people.

The discoveries of Shinichi Fujimura

- Arte facts dated back 600000 years

The suicide of Paul Kammerer

- During the 1920s an Austrian scientist named Paul Kammerer designed an experiment to prove that Lamarckian inheritance (the notion that organisms may acquire characteristics and pass them to their offspring) was possible. His experiment involved a species of toad called the Midwife Toad. Most toads mate in water – resulting in scaly black bumps on their hindlimbs which allow them to hold on to each other during mating, but the midwife toad mates on land – and therefore does not have these lumps. Kammerer said that by forcing midwife toads to mate in water, he could prove that they would develop the same bumps.

The final point

- Kammerer mated a number of generations of toads in a fishtank full of water. Eventually he announced that he had succeeded and he presented a group of midwife toads with black bumps on their hindlimbs.
- However, in 1926, Dr G. K. Noble studied the famous toads and discovered that the black bumps were in fact ink that had been injected in to the hind legs of the toads. When the fraud was unveiled in 1926, Kammerer was humiliated. He insisted that he had not injected ink into the toads and suggested that one of his lab assistants might have done it. Kammerer committed suicide a few days later.

Why on earth???

- False science could be results of quite reasonable and innocent actions like unavoidable experimental errors;
- The opponents could state that the experimental errors could be result of a vicious purpose, e.g. proving a hypothesis wished by the researcher;
- The compromise is to follow the moral and scientific ethics

Ideological reasons

- The examples are quite many:
- “Jewish” vs. “Aryan” science in Nazi-era
- The only true science is the soviet science
- Cosmic competition in cold war era
- East minus West equal to zero (Werner Keller study)

Anthropometric lesson in the Third Reich

- The shape of the Jewish nose

The story of Lisenko

Cold war competition

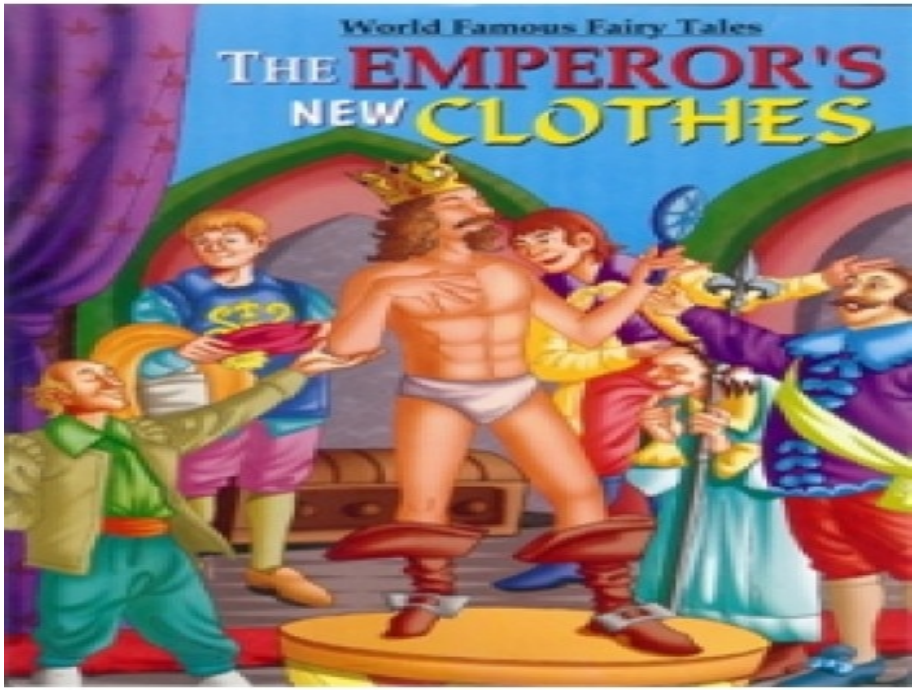
- Kennedy – Hrushchov Canadian wrestling

Personal reasons

- Rapid advance in career
- Opposing correct paradigms, theories
- Pretending to fighting myths
- Megalomania
- Self-deception
- Wrong advisors

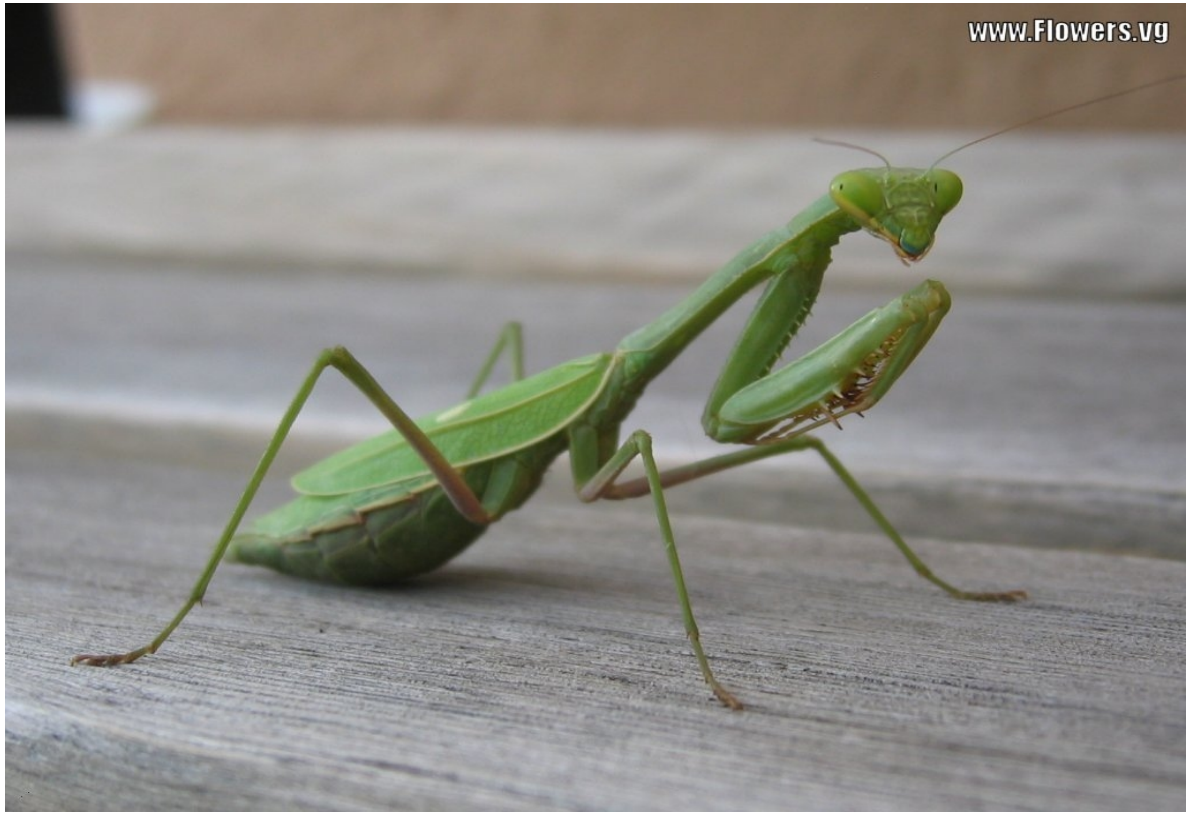
It happens in science, too…

- Is the king naked or this is self-deception?



Mantis mythos

- Is the mantis a cannibal?



Instead of a conclusion

- No specific conclusions and advices are needed
- Science is a human activity, therefore, subject to individual and collective errors
- There is still moral in science, there are enough examples
- Science is an ethic virtue

The last slide

- Should we forgive the sinners?
- Is each one of us potential sinner - remember the statement in the Holy Book

  LET HIM WITHOUT SIN, CAST THE FIRST STONE
- But we ought not to forget the scientific logic, too

  JUSTICE MUST PREVAIL