Science is dead
Long live science!

"If you see fraud and don't shout 'fraud!', you are fraud!"

- Nassim Nicholas Taleb

Peter Stallinga, University of the Algarve, 28 november 2013
Overview

- Why am I talking to you today?
- History of science
- What is science?
- Our education system
- Our funding system
- Our peer-review system
- Examples. Heroes and fraudsters.
Science (definition)

Science = knowledge
Science is the search for knowledge
Science is the love for knowledge (philosophy)

Knowledge, and only knowledge (not important for whom, how, why or what)
Science (examples)

Ex. (actually not science). If you find out that
- Women have 8% smaller brain
Controversial examples
- Women have 8% smaller brain,
- Men (&women) evolved from apes (Darwin),
- You can blow up the planet with nuclear fission (Curie),
- The capital is destroying humanity (Marx),
- God does not exist (Gödel).

No politics. No money. No religion (dogmas)

Note: in 2013, 3 out of 5 are still taboo
What science is not

- Science is not “knowing how to make things” (that is technology)
- Science is not “advanced (intelligent) research” (ex. tallying of fish stock, “knowing how many sardines in Algarve waters”)
- Science is not “solving problems” (ex. new solar panels to fight climate change)

“Philosophy is not a strategy”
- anonymous
History of science. 17\textsuperscript{th}/18\textsuperscript{th} century
Renaissance

- Science was the study of natural laws
- Studying and understanding the world around us
- Trying to describe it in simple laws
- Examples: Darwin, Galileo, Kepler, Newton
History of science. 19\textsuperscript{Th} century

- Science is the research that follows the 'Scientific Method'
- Heydays of science. Science reached its maximum (ca. 1940)
History of science. Late 20\textsuperscript{th} century

- Science is “reliable, teachable knowledge”
  
  This makes all religions science ('reliable' is a fuzzy word!)

  It makes all dogmas science. A dogma is per definition reliable!

  \textbf{You can call anything you want 'science'}

  “Dogmas are collective conceptual prisons. And the strange thing is that people love their prison cells because they give them a sense of security and a false sense of 'I know.' Nothing has inflicted more suffering on humanity than its dogmas”

  - Eckhart Tolle
History of science. Late 20\textsuperscript{th} century

- First (ca. 1950): distinction between “pure” / “fundamental” science and “applied” science. Money could be made that way (except for scientists*) and wars won. Ex. “computer science” and “rocket science”

- In 2013 nearly all science is required to make 'profit' (be useful somehow)

*: Nobel Prize is about 1 million euros; About equal to annual salary of a manager of a tiny bank (ex. BPN), or one-tenth of salary of CR7, or one-thousandth of income of African president's daughter
History of science. 21\textsuperscript{st} century

• Note: If you write a project proposal and have to explain why it is beneficial for society, it is not science! (It is 'research' at best)

How would Einstein write his project proposals in 2013?

“Anyone who thinks science is trying to make human life easier or more pleasant is utterly mistaken”
- Albert Einstein
History of science. 21\textsuperscript{st} century

- In 2013, science has to be 'politically correct'
History of science. 21st century

• In 2013, science has to be 'politically correct'
  Ex. Women have 8% smaller brain

Imagine writing “women have 8% less brains and are more stupid”

http://sacramento.cbslocal.com/2013/03/04/study-female-brains-are-smaller-than-male-brains-but-used-more-efficiently/
History of science. 21\textsuperscript{st} century

- Intermezzo. A test how much you are programmed to give standard answers without thinking:
History of science. 21st century

• Intermezzo. A test how much you are programmed to give standard answers without thinking:

What is the oldest profession in the world?

(How long did it take you to come up with an answer? Have you ever thought about the question? Are you sure of your answer?)
21st century science

University of (California at) Berkeley definition of science*:

1) Research (no restriction)

2) Community ('peer reviewing')

3) Benefits (for society)

*: http://undsci.berkeley.edu/article/scienceflowchart

How science works: The flowchart

This flowchart represents the process of scientific inquiry, through which we build reliable knowledge of the natural world. You can use it to trace the development of different scientific ideas and/or the research efforts of individual scientists. Most ideas take a circuitous path through the process, shaped by unique people and events.

Move your mouse pointer over the flowchart to reveal an additional level of detail. Click on items in the flowchart to get further information in Understanding Science 101.
21st century science

University of (California at) Berkeley definition of science*:

1) Research (no restriction)
2) Community ('peer reviewing')
3) Benefits (for society)

+ Satisfy curiosity. Build knowledge
- Develop technology. Address social issues. Inform policy.
  Solve everyday problems

*: http://undsci.berkeley.edu/article/scienceflowchart
21st century science

University of (California at) Berkeley definition of science*:

1) Research (no restriction)

2) Community ('peer reviewing')

3) Benefits (for society)

+ Replication. Feedback. Discussion. Publication

- Peer review

http://undsci.berkeley.edu/article/scienceflowchart
Repeating an experiment is essential in science.

2013: Need for replication is annoying (and is even outsourced to commercial entities)*

Stallinga: “When a source of information has a stake in a discussion, its information has to be ignored”


Peer review: Good, but who controls the controllers?

Editors afraid to publish climate skeptic papers (if this were common practice, there would be no editors left anymore)

Political pressure!

Editor forced to quit for accepting a bad paper

Peer review: The climate-research blog RealClimate and other mainstream researchers complained that the paper was fundamentally flawed, but the Remote Sensing article garnered support from climate skeptics and significant press attention.

The editor of the journal Remote Sensing resigned today, saying in an editorial that his journal never should have published a controversial paper in July that challenged the reliability of climate models used to forecast global warming.

The paper, by Roy Spencer and William Braswell of the University of Alabama in Huntsville, proposed that climate researchers have likely made a fundamental error by overestimating the sensitivity of the climate to greenhouse gas pollution.

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21st century science

1) (General) research
   (including technology and tallying)

2) Politically correct

3) Profit

Science does not even have to be the truth!
Science does not even have to be innovating
21\textsuperscript{st} century science

- **MISCONCEPTION:** There is a single Scientific Method that all scientists follow.

**CORRECTION:** "The Scientific Method" is often taught in science courses as a simple way to understand the basics of scientific testing. In fact, the Scientific Method represents how scientists usually write up the results of their studies (and how a few investigations are actually done), but it is a grossly oversimplified representation of how scientists generally build knowledge. The process of science is exciting, complex, and unpredictable. It involves many different people, engaged in many different activities, in many different orders. To review a more accurate representation of the process of science, explore our flowchart.

http://undsci.berkeley.edu/teaching/misconceptions.php#b1

Science has been redefined!
21st century science

- MISCONCEPTION: Scientists are completely objective in their evaluation of scientific ideas and evidence.

CORRECTION: Scientists do strive to be unbiased as they consider different scientific ideas, but scientists are people too. They have different personal beliefs and goals — and may favor different hypotheses for different reasons. Individual scientists may not be completely objective, but science can overcome this hurdle through the action of the scientific community, which scrutinizes scientific work and helps balance biases. To learn more, visit Scientific scrutiny in our section on the social side of science.

http://undsci.berkeley.edu/teaching/misconceptions.php#b1

Science has been redefined!
“It's OK if you are biased, you're colleagues will correct you”
21st century science

- **MISCONCEPTION:** Science is pure. Scientists work without considering the applications of their ideas.

  **CORRECTION:** It's true that some scientific research is performed without any attention to its applications, but this is certainly not true of all science. Many scientists choose specific areas of research (e.g., malaria genetics) because of the practical ramifications new knowledge in these areas might have. And often, basic research that is performed without any aim toward potential applications later winds up being extremely useful. To learn about some of the many applications of scientific knowledge visit [What has science done for you lately?](http://undsci.berkeley.edu/teaching/misconceptions.php#b1)

Science has been redefined!
“Science should be useful”

Note: There is nothing wrong with studying something useful, but science itself is not interested in the usefulness. The usefulness is for engineers!
Philosophy

- Mother of science (philosophy): Main topic of philosophy: God
MISCONCEPTION: Science contradicts the existence of God.

CORRECTION: Because of some vocal individuals (both inside and outside of science) stridently declaring their beliefs, it's easy to get the impression that science and religion are at war. In fact, people of many different faiths and levels of scientific expertise see no contradiction at all between science and religion. Because science deals only with natural phenomena and explanations, it cannot support or contradict the existence of supernatural entities — like God. To learn more, visit our side trip Science and religion: Reconcilable differences.

Freedom of belief is a Human Right. Science should submit to these rights (be 'politically correct')
Science and religion

In fact, science and religion are at war:

- Religion is believing without proof or question. It is faith vs.
- Science is knowing based on evidence, deduction, induction and falsification

Note: there is no war between religion and technology. Engineers implementing the miracles of God
Science and religion

- Martin Luther

This is the biggest declaration of war imaginable.

In 2013, faith has won the battle. Reason is forbidden. As per declaration of the United Nations and adopted by universities (such as UCB)
In fact, science (philosophy) **can** make statements about supernatural beings.

**Philosophy:**

*William of Ockham*: Ockham's Razor: if two models (theories/hypotheses) can explain observations, the simpler model with less features is correct.

*Saint Exupéry*: We should not be happy when there is nothing more to add to our model, but nothing more to remove.
Science and religion

In fact, science (philosophy) can make statements about supernatural entities

God does not exist:

1) No entity is needed to explain the existence of the universe nor any of the observations made, therefore, this entity does not exist (Ockham's Razor)

2) If an entity is needed to explain a system so complex as our universe, i.e., a Creator, then who created the complex system of the Creator? (The unmovable Mover)

1+2: God does not exist

Read for example Engels' “Anti-Duehring”
Science and religion

In fact, science (philosophy) can make statements about supernatural beings.

God does exist (Ontological argument):

1) God is per definition perfect

2) The non existence of something makes that something less than perfect

1+2: God exists
Science and religion

As you can see, philosophy, the scientific reasoning, can (and does) make statements on this subject.

In fact, science is addressing the related issue of the Big Bang and throws in all 'weapons'. It is a question that interests us all. We even build accelerators to find the so-called god-particle (Higgs boson*).

*: Note the search for the Higgs ('hoax') boson, however, is not science.
Science and religion

Scientific ('double blind') statistical studies have been done on the effects of praying.

An example of praying for sick people*. Conclusion:
- People that did not know somebody was praying for them: no effect
- People that did know somebody was praying for them: increased death rate

Other research concludes the opposite, but have all been debunked (and never any editor of any journal was sacked!)

*: Described in Richard Dawkins, “the God Delusion”
Politics and public opinion

Climate change: If it is true, it is very very important and ... **therefore** it is true, because we have to **act as if** it were true.

Then, because it is true, we must hire 'scientists' to **prove it**, and make propaganda to brainwash the people into **believing** it is true (because there is a benefit/profit to do so)!
Public opinion

Climate change: *If* it is true, it is very very important and .. *therefore* it is true

This is an example of Pascal's Wager:
“I do not know whether God exists, but I know that I have nothing to gain from being an atheist if he does not exist, whereas I have plenty to lose if he does. Hence this justifies my belief in God”

Even better than believing in God, is convincing others! (double bonus when knocking at the pearly gates of heaven). 'Jehova's Witness stance'.

Stallinga & Khmelinskii, “Psychology of global warming modeled with Game Theory decision tables” (Rev. Phil. Psych. 2013)
(Next week's seminar of DEEI)
Circular reasoning: Climate Change? **If it is true, it is very very important and .. therefore it is true**

The benefit for society (if true) is huge. Therefore, **we are morally obliged to force a consensus in science, and brainwash the public by all means possible**

Science needs benefit/outcome/relevance and thus we are allowed to be biased, omit data, falsify data, tell half truths, etc.

Result: Society is full of ignorant idiots that strongly believe in Global Warming and are shouting the words of the prophets, calling all real scientists Anti-Christ,s, etc.
It's all about the money .... $ 

Science needs benefit/outcome/relevance and thus we are allowed to prove the need of a product any way we can if it makes profit 

Example: 
Statins (AstraZeneca) sold to fight alleged problems with cholesterol. AZ invented a medicine (statins) and then invented an illness to market the medicine. Paid research to prove the efficiency of statins (Or Tamiflu sold to fight the Mexican Flu 'epidemic') 

That is what means 'benefits and outcomes' .... ! 

Stallinga prediction: the research will prove the benefit of statins just to the moment of expiration of the patent. The very next day, cholesterol will become a non-issue!
It's all about the money .... $

CEO's of large pharmaceutical companies:

“We will not do research on finding **cures** for illnesses, but only for **treatments**, because we have to guarantee continuity – that we can also do research in 20 years from now – and for that we need a steady stream of money”
It's all about the money .... $ 

Science needs benefit/outcome/relevance and thus we are allowed to prove the need of a product any way we can

Stallinga: “When a source of information has a stake in a discussion, its information has to be ignored”

Science and money are contradictory
Now, imagine two groups of climatologist

1) “The end of the world is coming. The planet will heat up. You have to fund my research, or we are all doomed!!!!”

2) “There is nothing wrong with the climate. My work is therefore rather irrelevant, except to satisfy my (personal) curiosity. Can you please fund my research?”
It's all about politics

1) 1982: Roger Revelle* needed funding for his atmospheric research

2) 1984: Alleged CO2 problem used to break coal miners trade unions in UK by liberalist Ms. Margaret Thatcher, who later also inaugurated Hadley science center (IPCC main nucleus)

*: Roger Revelle is lifelong friend of Mr. Al Gore (Bachelor in Arts and politician)

21st century science

Think outside the box ....

But within the boundaries we have set for you!

1) (General) research (including technology and tallying)

2) Politically correct

3) Profit
21st century science

Science?

Invent new products you can sell. Like a USB keyboard vacuum cleaner (which must be the most stupid idea of mankind ever. Just hold your keyboard upside down, duh!)
Science 2013? Stallinga's research: Invent expensive new light sources (LEDs) to replace cheaper incandescent light bulbs and then let people heat their homes electrically (when it is dark, it is normally cold), while turning every city into some kind of Las Vegas. (No technology ever reduced energy consumption!)
Science 2013? Drill holes in arctic seabed to prove your thesis (what you already know) and even contribute massively to the alleged problem being studied.

Every drill hole costs ca. $10 million and has a huge CO2 footprint.
Peer reviewing

So far we have seen:
- Individual scientist is allowed to be biased (Berkeley definition)
- Editors not politically correct are fired (see Spence paper). No true controllers of the controllers

Now let's see where this leads to
Peer reviewing

1) Referees are randomly taken from literature. More papers published, more chance of being selected for refereeing

2) Referees, with (allowed!) cognitive biases ignore scientific reasoning and accept papers in favor of their beliefs more readily than those against them

Result: Positive feedback:
If 'belief A' has a slight advantage over contradicting 'belief B', B will be filtered out completely in a Darwinistic way. Belief B, without publications, will get no funding and will be without a job.

Voilá The Great Heroic Consensus, 100% ('saturation'). A nice social network of like-minded dogmatic idiots. A religion!

*: (Stallinga & Khmelinskii, “Physchology of Global Warming modeled by Game Theory decision tables”, 2013)
Peer reviewing; Consensus

Consensus is not a scientific argument

People going against the consensus are scientific heroes. Never the ones who repeat the consensus dogmas!

“Eppur si muove!”
- Galileo

(And yet, it moves ...)
"The task of climate change agencies is not to persuade by rational argument ... Instead, we need to work in a more shrewd and contemporary way, using subtle techniques of engagement ... The 'facts' need to be treated as being so taken-for-granted that they need not be spoken. Ultimately, positive climate behaviours need to be approached in the same way as marketeers approach acts of buying and consuming ... It amounts to treating climate-friendly activity as a brand that can be sold. This is, we believe, the route to mass behaviour change”

*: Brainwashing is called 'persuasion strategy' in political research jargon: “Our hope is that researchers will design persuasion strategies that effectively change people’s implicit attitudes without them having to suffer through a disaster”°

Global warming: the chilling effect on free speech

The demonisation of 'climate change denial' is an affront to open and rational debate.

Denying AGW = denying Holocaust!
(Note: Skeptics do not deny anything, but want to do science)
Politics. Consensus

Troika: “>90% national debt is bad. Hand over all your money to the capital and everything will be OK”

.. and, just ignore reality

(Krugman: they made the classical scientific error of confusing 'correlation' with 'causation')
arXiv:1305.5373
Definition of science (mid 20\textsuperscript{th} century)

The five basic principles of the Scientific Method (of Karl Popper)

ISBN: 0-335-10107-0

ISBN: 978-0262560030
The 'Scientific Method'
Ants

- A scientists shouts to ants “go”, and the ants walk
- Scientist cuts of legs, shouts “go” and the ants don't walk

Conclusion: Ants hear with their legs!
The 'Scientific Method'

2:  

- Effort is spent (by the author) on proving it wrong. **Falsification**

- Author of hypothesis says where the model is strong, but also, where it is weak

*:  “In other words, we are trying to prove ourselves wrong as quickly as possible, because only that way we can find progress”

- Richard Feynman
The 'Scientific Method'

3. Creators of the model should convince the readers that it is the only model that explains the observations.
The 'Scientific Method'

4: The model should contain a **verifiable prediction** (It should be possible to apply Item 2, falsification)*

Ex.: prediction of Einstein of anomalous (non-Kepler) orbit of Mercury

*: “Science is only useful if it tells you about some experiment that has not been done, it is no good if it only tells you what went on”

- Richard Feynman
The 'Scientific Method'

5: - Replication. Other scientists can repeat the work presented

After you have tried to destroy your own theory and haven't managed, publish your work and let others have a go at it, for that they need:
- the description of the techniques used
- the logic reasoning used
- the raw data
The 'Scientific Method'

No mention of
- political correctness
- consensus
- benefits and outcomes
- peer reviewing (in first step)
- restriction of subjects to study
Science in 2000

FALSIFICATIONISM FALSIFIED

ABSTRACT. A conceptual analysis of falsificationism is performed, in which the central falsificationist thesis is divided into several components. Furthermore, an empirical study of falsification in science is reported, based on the 70 scientific contributions that were published as articles in Nature in 2000. Only one of these articles conformed to the falsificationist recipe for successful science, namely the falsification of a hypothesis that is more accessible to falsification than to verification. It is argued that falsificationism relies on an incorrect view of the nature of scientific inquiry and that it is, therefore, not a tenable research methodology.

KEY WORDS: falsification, falsificationism, verification, hypothesis testing, explorative research, Karl Popper

Out of 70 papers of the journal Nature in 2000, only one used the Scientific Method that includes a falsification of a hypothesis.
The 'Scientific Method'

Higgs Boson?

1: Hypothesis    ok
2: Falsification  x
3: Only model     ?
4: Prediction     ok
5: Replication    ?

They only spent effort on proving themselves right.

The theory did not include a falsifiable point “Higgs boson does not exist if ...”

Hoax boson!
Global Warming

1: Hypothesis: Yes:
- “Human CO2 causes $T$ increase”

2: Falsification: No:
- Only effort spent on proving it (no funding for opposite)
- Publications and research filtered out in Darwinian feedback way
- Falsification is 'politically incorrect' and equal to denying Holocaust
- Not falsifiable with observations. Models (Bayesian) change every year
- Contradicting data seen as proof (ex. Icebergs in Australia)*

3: Only model. No:
- Models “no warming” and “linear warming” not rejected yet
- Model Bayesian adjusted (retrodiction). A set of models exists

4: Prediction. No:
- Predictions made, all failed. Hypothesis not rejected, though

5: Replication. No:
- Models and reasoning not published. Only results of simulations

*: Cognitive bias called 'backfire' of Festinger. See Stallinga & Khmelinskii, “Psychology of global warming modeled with Game Theory decision tables” (Rev. Phil. Psych. 2013)(Next week’s seminar of DEEI)
Global Warming

5: Replication. No:
- Models and reasoning not published. Only results of simulations

- Steve McIntyre asked Michael Mann for data that resulted in famous Hockey Stick (see above)
- Mann refused to give data. McIntyre put him and university (Penn State) in court and won
- Data released show that Hockey Stick is a fraud

“Mann performed his original r2 tests [...] showed his procedure was bad (ie it created hockey sticks whatever numbers were fed in, and he knew it)”*

- Science and technology/engineering have been mixed ('science' sounds more sexy?). Ex. In 2013 and Engineer gets a PhD diploma

- Education is 'dogmatic'. We tell the students that we know how the world works and there is no room for doubt
- Made worse by 'standardizing' education. Ex. 'Bologna' (People advocating 'biodiversity' are normally against 'intellectual diversity')!

- The idea is 'science is settled'. We just can now work out the details (technology). Ex. Build a Large(r) Hadron Collider if Higgs boson is discovered.
- Situation similar to the beginning of 20th century

- Research is only technology (Ex. Projects include 'milestones' and 'deliverables') and is aimed at proving what we already know. Ex. How would Einstein do in 2013?
Serendipity

“Advances are made by answering questions. Discoveries are made by questioning answers”

- Bernard Haisch

An underestimated feature in 2013: **Serendipity**. (Discovering things by random 'error')

- A scientist should be multi-area and not have a limited vision
- Difficult in a culture 'publish or perish'
- Stop the publication spam!

The rest is technology
Long live science!

Science is unstoppable. Even if it is not done by 'scientists'

Nassim Nicholas Taleb
(A successful stock market broker. Not a [professional] scientist!)

“Deluded by the simplicity of the bell curve”

- Nassim Nicholas Taleb
Bell curves as coin flipping

10 flips

\[ P(X = k) = \binom{n}{k} / 2^n \]

infinite flips

\[ f(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{x^2}{2}}. \]

+: Central Limit Theorem: Any random variable will become Gaussian when repeated infinitely
Ludic Fallacy

Nassim Nicholas Taleb, The Ludic Fallacy:

Analysts describe the past with bell curves (Gaussian, Normal distribution), not because that is the true distribution, but because the ignorami do not know anything better.

Reality is not a bell curve (combination of a large number of 'coin flips') but a scalable function.
Result: every now and then an 'impossible' event, 'Black Swan', occurs that destroys everything (Ex. Stock market crash).
Stallinga: Apply this to the weather/climate:

Nature is not flipping coins. “30% chance of rain tomorrow” is not that tomorrow nature will flip a coin and decide if it will rain or not. The chance of rain is either 0% or 100%, but our uncertainty makes us attribute a probability.

IPCC FAQ 9.1
Using bell curve to prove climate changes in Switzerland
In other words, people that say they know the truth (example by consensus), are complete idiots
Conclusions

- Science is dead (not performed by professionals). “Science is not a strategy” (technology is!). “Horizons 2020” is a political program to replace human labor with technology and push humans into poverty.

- Science is alive. You cannot stop people to think and come up with beautiful ideas.

- There is still a lot of work to be done, also in technology and engineering. Note: science is not better than technology. (It is just different).

- Don't be ashamed of your own ideas. Really think out of their box. Don't be afraid being politically incorrect, or to go against dogmas. Be a skeptic! Be agnostic! Don't be a sucker!

Special thanks to Prof. Igor Khmelinskii

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