Workshop on How to Publish Papers in International Journals: February 2018

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Scientific Fraud

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Scientific Fraud

Basically scientific fraud is getting credit for something you did not do. New types of unethical behaviour are being invented all the time so one cannot be comprehensive. Some common forms of Scientific Fraud:

- **Inventing scientific data. OK – that is stating the obvious!**
- **Stealing data from someone else (this is done in many ways).**
- **Suppressing experimental results that to not support your idea. This issue can be a bit fuzzy. All active scientists have files full of experiments that "did not work". Are those "failed experiments" trying to tell you something you do not recognise?**
- **Abusing statistics to deliberately misinterpret data (big tobacco, insecticides, toxic waste, pharmaceuticals, anti-global warming).**
- **Money and science to not mix very well, science can be corrupted,**
- **Scientific fraud discredits all the work you have done previously and potentially everyone you have ever worked with.**
- **Getting caught is a life sentence. You are <u>never</u> forgiven.**

Scientific Fraud - Main Points

- **Do not do it. No-one is ever forgiven for scientific fraud.**
- **If you do it you are fooling yourself.**
- **You will be caught due to simple errors, like falsifying dates on survey data for a study site when you were away at a conference. Fabricating data is a deadly sin and you will pay for it.**
- **Science is an incremental process and so scientific fraud usually shows itself – eventually. There is such a thing as objective truth.**
- **The best protection is do not put your name on work where you have not seen the work done. Be careful about your good name.**
- **That is why I have no sympathy for Prof Bullfrog and Prof Dracula who bully people into putting their names on their papers. It is only a matter of time before they get their name on the wrong paper. Their huge, often undeserved, reputation falls to the ground.**
- **Never work in a lab with 20 PhD students and 30 Post-docs. The boss has no idea what is going on in their own lab.**
- **The dead giveaway of fudged data is that the results look too good to be true. Be wary of perfect looking data.**

The Common Theme of Scientific Fraud

There is cheap and nasty Scientific Fraud and there is the Scientific Fraud perpetrated by very smart people that may be very hard to detect. The universal feature of Scientific fraud is:

"Tell them what they want to hear!"

The Piltdown Man fraud. 19th century evolutionists were convinced that the "missing link" between man and apes would have a human-like brain and an ape-like jaw. This proved to be incorrect. 20th century fossil finds showed that man's ancestors had human-like jaws and ape-like skulls and brain size. For a long time genuine prehuman Austropithicine fossils found in Africa were dismissed as only apes.

Tell them what they want to hear. Group portrait of the Piltdown skull being examined. Back row (from left): F. O. Barlow, G. Elliot Smith, Charles Dawson, Arthur Smith Woodward. Front row: A S Underwood, Arthur Keith, W. P. Pycraft, and Ray Lankester. Painting by John Cooke, 1915

It took over 40 years for it to be proven that Piltdown man was a fraud. It was a Medieval skull cap a few hundred years old (human) artificially stained to look very old and the jawbone of an orangutan with the tell-tale features of it being from an ape conveniently knocked off and the teeth doctored using a metal file.

One of the theories of who did it is that a technician made up the “fossil” as a practical joke on his boss.

We are unlikely to ever know for certain who did it but the “discoverer” Dawson is nevertheless the main suspect. It is now known that he seems to have been involved in other frauds.

Why did the Piltdown Man fraud take so long to be recognised? Remember what I told you about tell them what they want to hear.

1. It was exactly what was expected to be found and it was found in England. Irrational scientific nationalism is surprisingly common.
2. The discoverer (Dawson) was obviously an English gentleman and as everyone knows they never do naughty things.
3. The fossil was treated like the crown jewels and locked in a safe. Almost no-one was allowed to examine the originals. Researchers were given plaster cast copies to examine. No suspicious staining, could not see filing marks on teeth on the plaster casts.
4. Once the fossil was ^{14}C-dated it was an obvious fraud. The file-marks on the teeth were then noted and the suspicious staining was noticed.
5. Some “foreigners” like French and Germans had doubted the fossil. Enough said. They were ignored because they were not British.
6. An Australian named Raymond DART found genuine human-ancestor fossils in Africa. His work was ridiculed for decades as merely “apes”.
7. He was Australian and not a gentleman and so it was perfectly right to ignore or belittle him.

Some things you should not do about Scientific Fraud

- The first urge is to report it but who do you tell and who would believe you? Nearly always it is simply what you saw going on in the lab. Who do you tell? The person you tell might already know about it but has chosen to keep quiet about it or even worse could be involved. Who do you trust? This is not a trivial problem or me being paranoid.
- I have personally come across scientific fraud going on in a lab twice in my career. In both cases I did nothing because I felt that complaining was pointless and dangerous.

My two experiences of Scientific Fraud

- In case #1 I very much liked the boss of the lab next door and knew he was honest and I felt bad that I never told him what was going on in his lab. I felt I could not risk telling him. It was only what I saw going on.

- In case #2 I hated the boss. I had been told to "build upon" previous work in his lab. One look at the Masters thesis convinced me the data was fraudulent. The same student was still there in the lab, doing a PhD. I set about to get my own set of basic data required for my project. After a few months I was fired for lack of progress. I gave the boss my lab book, surrendered the data to him and walked away and said I did not wish to take any further part in the project. Students in the lab knew the Masters work was fraudulent (they told me). Did the boss also know?

My Two Experiences of Scientific Fraud

Aftermath

- **Back in Australia I told an old retired Director of CSIRO Fisheries (GF Humphrey) my story #2. He told me that as a young man he had been handed a PhD and told to build upon it at Roscoff Marine Station in Europe. He realised it was fraudulent and started to do his own foundational work. He too got thrown out for "lack of progress" and wisely made no attempt to justify himself.**
- **Humphrey had a Law degree as well as a PhD in Science. He told me that I did the right thing to walk away.**

What to do about Scientific Fraud

What do you do if you find scientific fraud is going on in a laboratory where you are working?

- **Almost always attempts to report it have ruined the career of the person who tried to report it. I know of one exception (Vogt who reported the fraud in the Mark Spector affair at Cornell).**
- **Investigations and decisions can take 10 years or more (McBride case). What do you live on in the meantime?**
- **Remember your career is usually completely ruined if you are in any way involved. Do not allow your name to appear on a paper if you have any doubts.**
- **<u>Resign and run away</u> and make sure your name is not on any paper that comes out of that laboratory. Divorce absolute and running away is the best practical solution.**

The McBRIDE Case in Australia – birth defects in rabbits falsely claimed to be caused by a pharmaceutical. McBride was famous for previously identifying Thalidomide as causing birth defects.

Scientific Fraud: The McBride Case — Judgment

1.G F Humphrey, LLB MSc PhD

1. *Barrister, Supreme Court of NSW, Australia. School of Biological Sciences, University of Sydney, Australia 2006*

Abstract

Dr W G McBride, who was a specialist obstetrician and gynaecologist and the first to publish on the teratogenicity of thalidomide, has been removed from the medical register after a four-year inquiry by the Medical Tribunal of New South Wales. Of the 44 medical *practice* allegations made against him by the Department of Health only one minor one was found proved but 24 of the medical *research* allegations were found proved. Of these latter, the most serious was that in 1982 he published in a scientific journal, spurious results relating to laboratory experiments on pregnant rabbits dosed with scopolamine. Had Dr McBride used any of the many opportunities available to him to make an honest disclosure of his misdemeanour, his conduct would have been excused by the Tribunal. However, he persisted in denying his fraudulent conduct for several years, including the four years of the Inquiry. The Tribunal unanimously found Dr McBride not of good character in the context of fitness to practise medicine. The decision to deregister was taken by a majority of 3 to 1. Since research science is not organized as a profession, there are no formal sanctions which can be taken against his still engaging in such research.

Things to Note about the MacBride case

- **The judgment took 10 years,**
- **The whistle blowers were never given any compensation or reward (I think they all dropped out of research),**
- **He was not convicted of scientific fraud. He was de-registered from practicing medicine for being of "Bad Character". Scientific fraud is not actually a criminal offense in Australia or other countries (that is changing).**
- **Notice the last sentence "**Since research science is not organized as a profession, there are no formal sanctions which can be taken against his still engaging in such research".
- **Humphrey is the man I mentioned earlier about Roscoff.**

Warburg Effect Revisited: Merger of Biochemistry and Molecular Biology

Racker, Efraim; Spector, Mark

Science, Volume 213, Issue 4505, pp. 303-307

Over 50 years ago Warburg discovered that malignant cancers ferment glucose to lactic acid much more rapidly than most normal cells. In analyzing this phenomenon in a variety of tumors we found one common denominator: a high rate of adenosine triphosphate hydrolysis that delivers the adenosine diphosphate (ADP) and inorganic phosphate (P_i) required for glycolysis. However, the source of adenosinetriphosphatase (ATPase) activity varies; in some cells it is the sodium- and potassium-dependent ATPase, in others the mitochondrial ATPase, and in some perhaps a viral ATPase. In Ehrlich ascites tumor cells the sodium and potassium pump of the plasma membrane operates inefficiently. For each sodium ion pumped out of the cell, several ATP molecules are hydrolyzed. Thus, ADP and P_i, which are rate-limiting for glycolysis, are generated and permit the rapid formation of lactic acid. The Na^+,K^+ pump consists of two subunits. The α subunit contains the active center of the ATPase enzyme and the β subunit is a glycoprotein with unknown function. The pump is rendered inefficient by phosphorylation of the β subunit catalyzed by a protein kinase, PK_M, which is present in the plasma membrane of the tumor. This protein kinase is activated in turn by a cascade of the three other kinases PK_S, PK_L, and PK_F. The PK_F is immunologically related to the src gene product of Rous sarcoma virus. Each of the members of the protein kinase cascade phosphorylate other protein substrates, including components of the cytoskeleton. This may help to explain the remarkable pleiotropic manifestations of a transformation event controlled by a single gene.

DOI: 10.1126/science.6264596

This work is fabricated. But Spector did some other breakthrough work that was genuine! Where did the fraud start?

Proc. Natl. Acad. Sci. USA
Vol. 77, No. 2, pp. 957–959, February 1980
Botany

Purification of a manganese-containing protein involved in photosynthetic oxygen evolution and its use in reconstituting an active membrane

(photosystem II/spinach chloroplast/water oxidation)

MARK SPECTOR AND G. DOUGLAS WINGET

Department of Biological Sciences, University of Cincinnati, Cincinnati, Ohio 45221

Communicated by Roderick K. Clayton, November 19, 1979

ABSTRACT Extraction of thylakoid membranes with cholate in the presence of ammonium sulfate inactivated oxygen evolution and liberated a manganese-containing protein. This protein could be combined with preformed liposomes containing the depleted thylakoid membranes to restore 85% of the original oxygen-evolution activity. The protein did not affect the primary photochemical events of photosystem I or photosystem II, and it was required only for electron transport in which water was the electron donor. The protein has been purified to homogeneity and has an apparent molecular weight of 65,000 (polyacrylamide gel electrophoresis in the presence of sodium dodecyl sulfate). Atomic absorption revealed two atoms of manganese bound to each 65,000-dalton protein molecule. Treatment with alkaline Tris removed the bound manganese and rendered the protein incapable of restoring oxygen evolution; however, Tris treatment of the depleted membranes before reconstitution had no effect. Thus, this manganese protein is probably the site of Tris action in isolated chloroplasts and is at least part of the water-oxidation enzyme system.

Here is another paper by Mark Spector. It is apparently genuine work because other independent work support it.

Where did the real work end and the fraud start? That is the fundamental problem with the very smart but amoral scientific fraudster.

Racker spent years trying to work out what Spector work was genuine and what was not. What is strange is that the whole Spector fraud seems to have been carefully planned and set up. Why go to all the trouble?

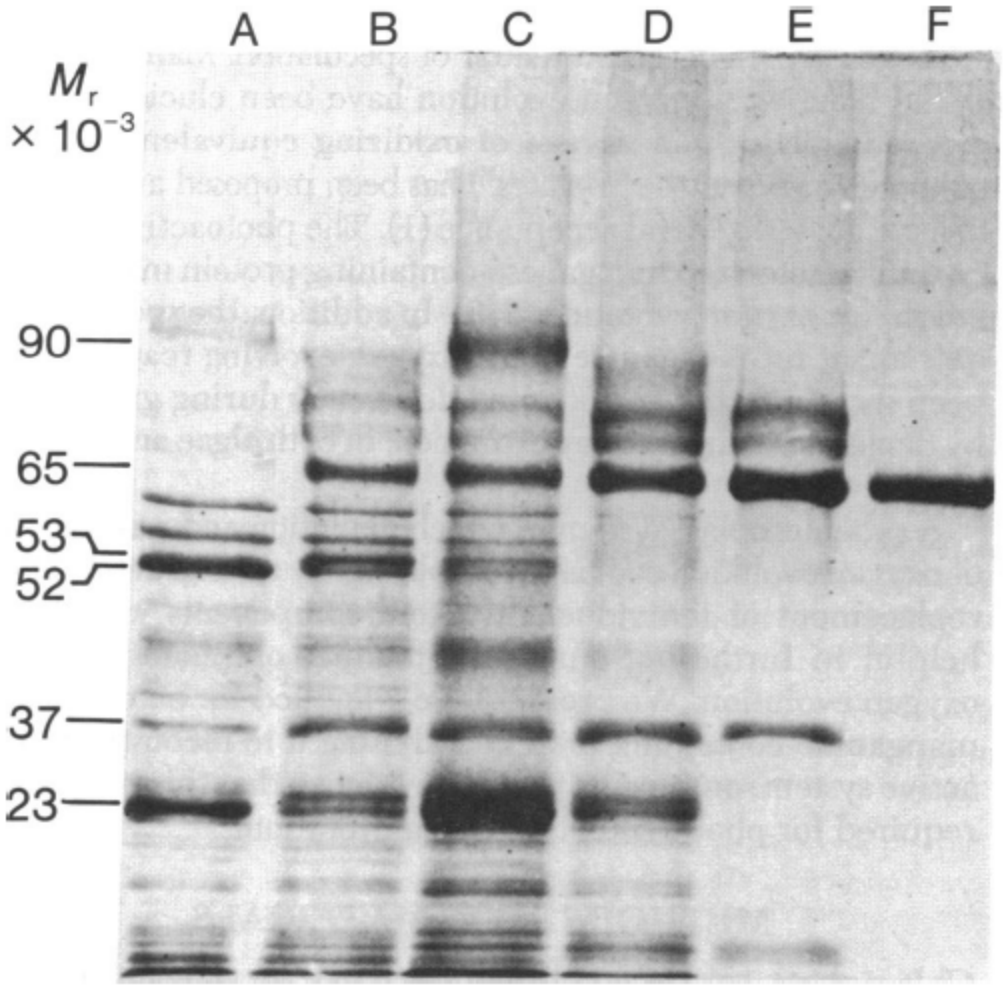


FIG. 1. Coomassie-blue stained proteins separated by NaDodSO$_4$/polyacrylamide gel electrophoresis at different stages of purification of the manganese-containing protein from spinach chloroplasts: lane A, isolated chloroplasts; lane B, supernatant after cholate extraction of chloroplasts; lane C, pellet from 1.2 M ammonium sulfate precipitation of B; lane D, pellet after reprecipitation of dissolved pellet from C with 0.84 M ammonium sulfate; lane E, active fraction collected by passing redissolved pellet (from D) over Sephadex G-200 column; lane F, active fraction collected after passing material from E over Sephadex G-100 column. See text for details of fractionation procedure.

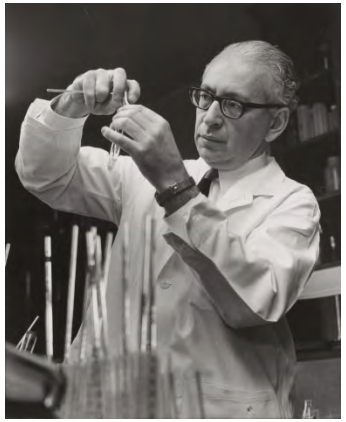
This is for those how do not know about Electrophoresis gels of proteins.

This is a picture of an electrophoresis gel from Spector's genuine paper with Wingett (Spector & Wingett, 1980). The dark lines are proteins stained with a blue dye called Coomassie blue.

In his work in Racker's lab he falsified the dark lines using a blue Pentel pen dipped in radioactive Iodine. Nice blue colour and the proteins on the gels were also supposed to have been labelled with ^{32}P so the labelled proteins showed up on X-ray film of the gel. He was only caught because the radiation produced by radioactive Iodine (^{125}I) is different from that of ^{32}P.

The Mark SPECTOR scandal (Wiley, 2008)

Mark SPECTOR – his mother told the officials at Cornell University that he had always told lies. Made some genuine breakthrough work but he thought he could get away with anything. His undergraduate degree was also found to be counterfeit. He also forged cheques. Habitual con-man.



Ephraim RACKER – he almost got the Nobel prize – twice. There was talk of he and Spector getting a joint Nobel.

Brilliant but credulous. Liked to be told what he wanted to hear. Had a rather comical Viennese Sigmund Freud accent. Originally trained as a psychiatrist. Liked to psychoanalyse people. Tried it on me: decided I was harmless. Turned out he refereed my first paper – told me when I met him that he was surprised I was so young. Asked me if I felt confident and secure at Cornell – I did.

Volker VOGT – he spotted the falsified electrophoresis gel labeled with a blue Pentel pen dipped in radioactive iodine. If the gel had been genuine, the ^{32}P beta radiation from the labeled proteins should not have penetrated through the perspex he put over the gel to demonstrate to some students the properties of ^{32}P beta rays. The Geiger counter clicked but it should not have. **He clicked**.

Elizabeth DENLEY I met her when we were both in Biology 1 at Sydney. We hated each other at sight.
A CLASSIC CASE OF SCIENTIFIC FRAUD. Expelled from Scripps Institute where she was doing a Post-Doctoral for fabricating sea urchin survey data on a date when she was away. As is usual, she was caught accidentally. She was convinced that she was surrounded by cullable fools and she could do anything she liked. The trouble with that attitude is that "idiots" sometimes notice things and it starts a snowballing effect or a collapsing house of cards.
She disappeared for many years then emerged out of the woodwork. Apparently she has lost her marbles but still finds gullible people to exploit. Predictably enough the UN is one of her victims. Rather shamefully she still tries to use her University of Sydney Honours and PhD degrees for credibility.
Very smart but Mad-Bad-and-Dangerous-to-Know.

http://omegawellbeing.org/our-team/elizabeth-denley/

http://en.heartfulness.org/blog/2015/05/17/heartfulness-elizabeth/

Lessons to be Learned

• Candidates for Graduate School need to have a note from their mother about whether they can be trusted. **Mark Spector's mother said he was always telling lies and could not be trusted.**

• If it is all too good to be true it is probably not true.

• Carefully check out people who seem to come from no-where. Australian universities typically recruit their Masters and PhD students from their own undergraduate classes. Americans do not.

• Spector had a falsified undergraduate degree and a conviction record for forgery.

Shewan LG and Coats AJS (2010) Ethics in the authorship and publishing of scientific articles. International Journal of Cardiology 144:1–2

All authors to papers in the International Journal of Cardiology must adhere to the following principles:

1. That the corresponding author has the approval of all other listed authors for the submission and publication of all versions of the manuscript.
2. That all people who have a right to be recognised as authors have been included on the list of authors and everyone listed as an author has made an independent material contribution to the manuscript.
3. That the work submitted in the manuscript is original and has not been published elsewhere and is not presently under consideration of publication by any other journal other than in oral, poster or abstract format.
4. That the material in the manuscript has been acquired according to modern ethical standards and has been approved by the legally appropriate ethical committee.
5. That the article does not contain material copied from anyone else without their written permission.
6. That all material which derives from prior work, including from the same authors, is properly attributed to the prior publication by proper citation.
7. That the manuscript will be maintained on the servers of the Journal and held to be a valid publication by the Journal only as long as all statements in these principles remain true.
8. That if any of the statements above ceases to be true the authors have a duty to notify the Journal as soon as possible so that the manuscript can be withdrawn.

*** Not a bad set of general guidelines.**

Some Personal Opinions on Scientific Fraud

- **Fudging data in an undergraduate students practical report is technically scientific fraud and should be treated as such. Do not teach cheating.**
- **Scientific fraud in Masters and PhD theses should warrant withdrawal of the thesis, however in my experience that happens only rarely. Comebacks like Liz DENLEY is why I feel scientific fraudsters should have their degrees withdrawn permanently.**
- **Cheap and nasty scientific fraud is relatively easy to spot because the perpetrators do not understand enough science to fabricate data properly. It is the smart ones that are difficult.**

The paradox of the super smart who really do not need to commit fraud but do anyway.

- These people are usually caught by accident.
- Their behaviour is basically psychopathic. They think they can get away with anything. They often have done so since childhood and will continue until perhaps one day they are caught (if ever).
- Their arrogance is what gets them caught. They become careless.

If Mark Spector had dipped his blue Pentel pen in a solution laced with ^{32}P and not radioiodine (^{131}I) he would never have been caught and discredited. He would now be at least Prof Mark SPECTOR.

- There is a snowball effect. Once suspicions are aroused all sorts of other things fall into place. A single falsified survey date or a single fudged electrophoresis gel is enough to get people looking at all other work by that individual. Things once ignored or skipped over are suddenly remembered and seen to fit a pattern. Because of the interconnectiveness of science the whole House-of-Cards falls.
- In my opinion they do it because they can and despise the rest of mankind.

Be very Wary of Scientific Fraud which is Stealing by Finding

Under English law there is a crime called Stealing by Finding. You find something and simply take it for your own use and make no reasonable effort to find the owner. You may know very well who owns it. For example, if you find a computer and you know whose it is but you simply take over use of it as your own. That is stealing by finding.

Some very low-quality scientific fraud is where someone finds published papers in a journal, scans them to extract the text and then tries to republish it under their own name in another journal. Sounds very crude but some have tried to do this and have succeeded in publishing the papers. Took years for them to be caught. Helps if the stolen work was in a foreign language journal like Thai, Chinese, Russian, French or Spanish. Sometimes this happens to people with their Masters or PhD thesis. Usually this type of fraud is found out.

More Fraud by Stealing-by-Finding and Theft of Ideas

In the Introduction and in the Discussion I warned everyone about being careless about who you show your draft manuscript to. You must treat it as a confidential document and impress upon your co-authors to be cautious about sees your paper to and who they talk to about your work.

My PhD supervisor was very naïve about such things and talked too much about my work to other people.

- **When I was a young man I always found it gratifying to tell people all about what I knew. More than a few people learnt to take advantage of that. They would come and talk to me about some problem. I would tell them everything I knew. I helpfully drew things on pieces of paper for them and they took notes. Soon enough I found more than once that they had given an exciting new project to one of their students. Prof Bullfrog did not tell the student where the ideas had come from. The student was told there was a strange PhD student/Post Doc named Ray Ritchie in the building up the road who was not worth talking to because he was an idiot. After all I look like one so I must be one.**
- **Theft of ideas. You gave your manuscript to someone or a careless co-author sent your draft to a friend in another university. They quickly set about to do the same experiments you describe in your manuscript and get it published quickly before you have even finished your own work.**

Scientific Fraud by Stealing-by-Finding and Theft of Ideas

There are people in the sciences who are scavengers and bottom feeders.

- **Prof Bullfrog and Prof Dracula go to seminars specifically looking for bright young students and post-docs to take advantage of. They are helpful and friendly. They may not only try to insinuate themselves onto co-authorship of your papers but they may simply steal your ideas and get their laboratory to do the same types of experiments you did and since they know more about writing and publishing than you do they publish their own work before you finish yours.**
- **Be wary of distinguished visiting Profs at seminars.**
- **The type is also common at conferences. Be a little wary.**
- **Result: You find you cannot get your own work published or you have to cite their paper in your manuscript even though you know perfectly well they stole your ideas.**

Scientific Fraud by Theft of Ideas
Stealing by Exploiting the Peer-Review System to Delay Publication

Suppose you send a paper to the Journal of Interesting Results. It is a respectable ISI-rated journal. The editor sends it out to referees. The paper is sent to our friend Prof Bullfrog who has a huge laboratory and 20 PhD students and 30 post-doctorals.

Unfortunately for you, Prof Bullfrog is impressed with the ideas behind your work and realises that the experimental work can be done quickly and easily. Prof Bullfrog deliberately delays your paper by being very slow in refereeing it and demanding time consuming revisions.

Meanwhile Prof Bullfrog assigns somebody in their lab to repeat the experiments described in your paper. The student/post doc might have no idea what is going on. Prof Bullfrog writes up the paper and sends it to The Journal of Very Important Work and gets it published almost immediately. Prof Bullfrog stole your idea but did not steal your data – merely did the experiments again. This type of unethical behaviour is probably common but not widely acknowledged.

Scientific Fraud by Theft of Ideas

Consequences

You get a letter from the Editor that a referee has pointed out that similar research has recently been published by Smith, J. & Bullfrog, P.I. (2016) Journal of Very Important Research 34: 345-356. You have not cited the paper (it appeared while your paper was under review). Even worse, the editor rejects your paper on the grounds that it is merely confirmatory of Smith & Bullfrog (2016). I have personal experience of this because it was once done to me.

But I thought of it first! What do you do? There is very little you can do because Prof Bullfrog did not steal your data, he stole your idea… Prof Bullfrog is smart enough not to actually steal your experimental data, simply doing the same experiments again is very hard to prove as fraudulent activity. Unfortunately, because science is a cumulative process people getting the same ideas at the same time is common in science and might not be fraud at all.

Final Thoughts on Fraudulent Activity in Science

1. **Life is not a Medieval Morality Play, Fairy Tale, Movie or TV show where the virtuous hero ultimately wins. The villain often retires as a distinguished Professor. Be stoical: do not be a villain yourself.**
2. **MacBRIDE might have had his medical licence withdrawn but he retired to his farm as a multimillionaire.**
3. **Mark SPECTOR eventually got a degree in Osteopathic Medicine (Wayne University). Just the sort of doctor you would want treating you. Caught cheating again in 1990s with falsified MD qualifications.**
4. **Elizabeth DENLEY did not lose her PhD. People still give her money.**
5. **The perpetrators of Scientific fraud often become full Professors.**
6. **Academics that simply stole others ideas because they are foolish enough to tell them about their latest ideas also become full Professors.**

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