Research and Academic Ethics

Outline

- Academic:
  - Definition of academic misconduct
  - Examples
- Research:
  - Research Misconduct
  - Conflicts of Interest
  - Environmental and Social Dimensions of Engineering Research
  - Data Management
  - Research, Ethics & Society

Academic Ethics

UC Berkeley defines a student code of conduct

(Edited/Modified January 2016)

BERKELEY CAMPUS CODE OF STUDENT CONDUCT

General Overview

The University of California at Berkeley is a community of scholars committed to maintaining an environment that encourages personal and intellectual growth. It is a community with high standards and high expectations for those who choose to become a part of it, including established rules of conduct intended to foster behaviors that are consistent with a civil and educational setting. Members of the University community are expected to comply with all laws, University policies and campus regulations, conducting themselves in ways that support a scholarly environment. In this context, faculty are guided by The Faculty Code of Conduct, Section 015 of the Academic Personnel Manual, and students by the Berkeley Campus Code of Student Conduct, articulated here.

Accompanying the Berkeley Campus Code of Student Conduct (Code) is an established process to determine if a student has violated the Code and to respond appropriately when violations are sustained. Students alleged to have violated the Code are given an opportunity to meet with a member of the Center for Student Conduct staff to discuss the incident in question. Most often complaints are resolved

https://sa.berkeley.edu/code-of-conduct

What is academic misconduct?

- Cheating (including collusion)
- Plagiarism (including self-plagiarism)
- False Information and Representation and Fabrication or Alteration of Information
- Theft or Damage of Intellectual Property
- Alteration of University Documents
- Disturbances in the Classroom or Lab
- Others…

Appendix II of UC Berkeley Student Code of Conduct

Cheating

"**Cheating** is defined as fraud, deceit, or dishonesty in an academic assignment, or using or attempting to use materials, or assisting others in using materials that are prohibited or inappropriate in the context of the academic assignment in question"

- *UC Berkeley Center for Student Conduct*

Cheating Examples

- Copying, attempting to copy, or communicating answers with another person during an exam.
- Preprogramming a calculator to contain answers or other unauthorized information for exams.
- Using unauthorized materials, prepared answers, written notes, or concealed information during an exam.
- Allowing others to do an assignment or portion of an assignment for you, including the use of a commercial term-paper service.
- Submission of the same assignment for more than one course without prior approval of all the instructors involved.
- Collaborating on an exam or assignment with any other person without prior approval from the instructor. (i.e. collusion)
- Taking an exam for another person or having someone take an exam for you.

Plagiarism

“**Plagiarism** is defined as use of intellectual material produced by another person without acknowledging its source.”

- *UC Berkeley Center for Student Conduct*

Plagiarism Examples

- Wholesale copying of passages from works of others into your homework, essay, term paper, or dissertation without acknowledgment.
- Use of the views, opinions, or insights of another without acknowledgment.
- Paraphrasing of another person's characteristic or original phraseology, metaphor, or other literary device without acknowledgment.

False Information and Representation and Fabrication or Alteration of Information

“Furnishing false information, failing to identify oneself honestly, fabricating or altering information and presenting it as legitimate, or providing false or misleading information to an instructor or any other University official in an academic context.”

- *UC Berkeley Student Code of Conduct (2016)*

False Information Examples

- Furnishing false information in the context of an academic assignment.
- Failing to identify yourself honestly in the context of an academic obligation.
- Fabricating or altering information or data and presenting it as legitimate.
- Providing false or misleading information to an instructor or any other University official.

Theft or Damage of Intellectual Property

“Sabotaging or stealing another person’s work, improper access to or electronically interfering with the property of another person or the University, or obtaining a copy of an exam or assignment prior to its approved release”

- *UC Berkeley Student Code of Conduct (2016)*

Theft or Damage of Intellectual Property Examples

- Sabotaging or stealing another person's assignment, book, paper, notes, experiment, project, electronic hardware or software.
- Improper access to, or electronically interfering with, the property of another person or the University via computer or other means.
- Obtaining a copy of an exam or assignment prior to its approved release by the instructor.

Alteration of University Documents

“Forgery of an instructor’s signature, submitting an altered transcript of grades to or from another institution or employer, putting one’s name on another individual’s work, or falsely altering a previously graded exam or assignment”

- *UC Berkeley Student Code of Conduct (2016)*

Alteration of University Documents Examples

- Forgery of an instructor's signature on a letter of recommendation or any other document.
- Submitting an altered transcript of grades to or from another institution or employer.
- Putting your name on another person's exam or assignment.
- Altering a previously graded exam or assignment for purposes of a grade appeal or of gaining points in a re-grading process.

Disturbances in the Classroom or Lab

These are defined as disturbances “that serve to create an unfair academic advantage for oneself or disadvantage for another member of the academic community.”

- *UC Berkeley Student Code of Conduct (2016)*

Disturbances in the Classroom or Lab Examples

- Interference with the course of instruction to the detriment of other students.
- Disruption of classes or other academic activities in an attempt to stifle academic freedom of speech.
- Failure to comply with the instructions or directives of the course instructor.
- Phoning in falsified bomb threats.
- Unnecessarily activating fire alarms

Misconduct in a Research Environment

Research Misconduct

Defined as fabrication, falsification, or plagiarism in proposing, performing or reviewing research, or in reporting research results. It does not include honest errors or differences of opinion. It encompasses, but is not limited to, research abstracts, research proposals, laboratory records, progress reports, theses, oral presentations, internal reports and journal articles. (OSTP 2000)

Research Misconduct

Fabrication: making up of data and results and reporting them. (OSTP 2000)

Falsification: manipulating research materials, equipment, or processes, or changing or omitting data or results such that research is not accurately represented in the research record. (OSTP 2000)

Plagiarism: appropriation of another person's ideas, processes, results, or words without giving appropriate credit. (OSTP 2000)

Other forms of misconduct

Fraud: means serious misconduct with intent to deceive

Ghostwriting: when someone other than the named authors makes a major contribution to a work

i.e., paying someone to write your paper for you

Conferring Authorship: listing someone as an author that has not made a major contribution to a work

i.e., putting someone on the author list for a favor down the road (also CoI)

What is practice but not misconduct

Papers described experiments as they should have been done, not as they were actually conducted, for logical presentation

- Experiments that led to nowhere (blind alleys)
- Failed experiment
- Amount of times it had to be repeated before a certain results
- Variability in an experiment

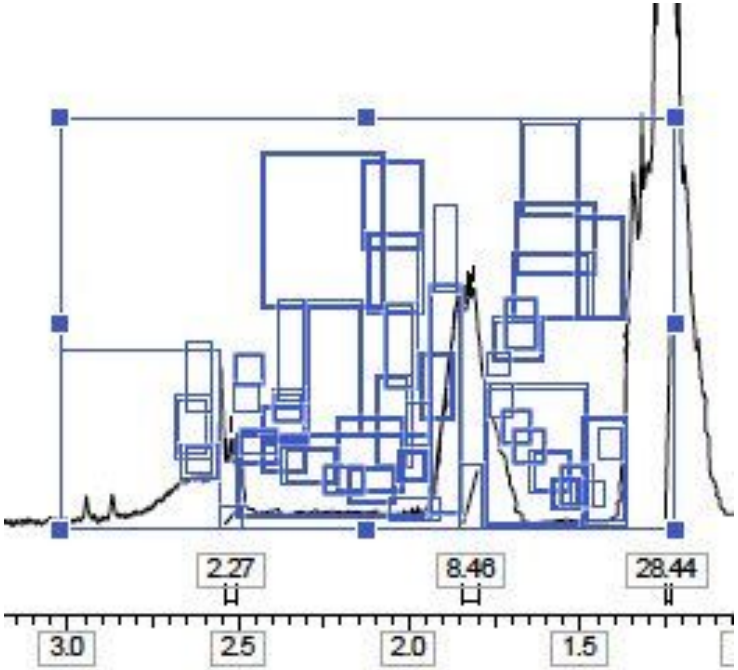
Research Misconduct - Factors

1. **Career Pressure**
    a. Struggle for scarce resources
    b. Peer review process
2. **Thought they knew what the results would be if they went through the trouble of doing the hard work**
3. **In a field were experiments are not expected to be precisely reproducible**
    a. In some fields, such as biology, variability is high and thus experiments are not always expected to be reproducible. Having that as a cover can make it easier to commit fraud. Most fraud has been committed in the biological sciences.

You will get caught

“Science is self-correcting, in the sense that a falsehood injected into the body of scientific knowledge will eventually be discovered and rejected. For just that reason, dissemination of falsehoods is never the purpose of those who perpetrate scientific fraud. Still, active measures to protect science are needed, because if the record became badly contaminated by fraudulent results, it would no longer be self-correcting” - David Goldstein

Image fraud



Issue 8 2019

Previous Article Next Article

From the journal:
Organic & Biomolecular Chemistry

Retraction: Organocatalytic stereoselective synthesis of passifloricin A

Check for updates

Pradeep Kumar,*[a] Menaka Pandey,[a] Priti Gupta[a] and Dilip D. Dhavale[b]

Author affiliations

Abstract

Retraction of 'Organocatalytic stereoselective synthesis of passifloricin A' by Pradeep Kumar *et al.*, *Org. Biomol. Chem.*, 2012, **10**, 1820–1825.

Problems & Prevalence: Data & Methods

Data

28%

- Falsifying or “cooking” research data
- Dropping observations or data points from analyses based on a gut feeling they were inaccurate
- Overlooking others’ use of flawed data or questionable interpretation of data
- Failing to present data that contradict one’s own previous research

Methods

37%

- Using inadequate or inappropriate research designs
- Inadequate record keeping related to research projects
- Withholding details of methodology or results in papers or proposals

“How Many Scientists Fabricate and Falsify Research? A Systematic Review and Meta-Analysis of Survey Data” https://doi.org/10.1371/journal.pone.0005738 2009

Problems & Prevalence: Influence & Credit

Influence

27%

- Not properly disclosing involvement in firms whose products are based on one's own research
- Unauthorized use of confidential information in connection with one's own research
- Changing the design, methodology or results of a study in response to pressure from a funding source
- Modifying research directions or agendas to fit the priorities of funder

13%

Credit

- Using another's ideas without obtaining permission or giving due credit
- Inappropriately assigning authorship credit
- Trying to get by on the work of others
- Publishing the same data or results in two or more publications

"How Many Scientists Fabricate and Falsify Research? A Systematic Review and Meta-Analysis of Survey Data" https://doi.org/10.1371/journal.pone.0005738 2009

Problems & Prevalence: Cutting Corners

Cutting Corners

50%

- Inadequate monitoring of research projects because of work overload
- Cutting corners in a hurry to complete a project
- Signing a form, letter, or report without reading it completely

Research Misconduct Quote

"Some of the phenomena that have driven this narrative, in addition to the regular appearance of highly visible research misconduct cases, include growing evidence that half or more of the published results in some fields are not reproducible, the remarkable growth in the number of retractions of journal articles, and the appearance of new forms of detrimental research practices such as journals that charge authors to publish but appear to do no quality control. According to the *Economist*, "Fraud is very likely second to incompetence in generating erroneous results, though it is hard to tell for certain" (*Economist*, 2013)."

Managing Conflicts of Interests as a Graduate Student

What is a Conflict of Interest (CoI)?

Conflicts of interest are arrangements in which a professional's ability to observe, judge, and act according to the moral requirements of their role are or will be compromised

Types of Conflicts of Interests

Financial COI

Institutional COI

Commitment COI

CoI impede scientific integrity and fidelity

Scientific Integrity: “characterized as a commitment to truthfulness, to personal accountability, and to vigorous adherence to standards of professional conduct(e.g., accuracy, fairness, collegiality, transparency)”

Scientific Fidelity: “the notion of faithfully living up to one’s commitment”

Some popular examples

Example: Relate to academic promotion, inappropriate data interpretation, or expression of personal political or religious values in interactions with participants or patients

Example: Approval for publication of data resides with an ‘interested party’ upon whom the researcher depends for resources (e.g., funds, access to participants)

Hypothetical examples of these conflicts range from the pharmaceutical company that seeks to publish only positive findings to the small community IRB that seeks to prevent the publication of stigmatizing study results

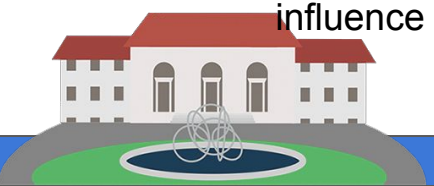
UC Guiding Principles

1. Open Academic Involvement:
    a. Private sector relationship should enhance education, not restrict academic choices
    b. Students have the right to move freely between advisors
    c. Students have right to change topic area/research directions
    d. Field of research cannot be narrowed by private sector
    e. Involvement with private sector cannot limit post-graduate employment choices

https://www.ucop.edu/academic-personnel-programs/_files/apm/apm-025-07-01.pdf

UC Guiding Principles

1. Freedom to Publish
    a. Students have ability to complete and publish thesis and to freely publish, present or disclose research to the academic community and public at large
    b. Short, reasonable delays may arise with respect to disclosure of proprietary data (patents)
2. Right to Conduct Future Research
    a. Students have the ability to use results in future research and educational activities
3. Outside Professional Activities
    a. Graduate students can participate in professional activities with faculty members, but faculty should ensure that thesis or dissertation work is not compromised as a result of involvement
4. Responsibility to Students
    a. Students have the right to have an academic and research environment free from undue influence of private outside interests



https://www.ucop.edu/academic-personnel-programs/_files/apm/apm-025-07-01.pdf

What do you do during a CoI?

- Talk to office staff (Not Confidential)
- Talk to UCB Office of Ombuds
- Talk to major field advisors, department chair (Not Confidential)

Case Study #1

Jaime works in a lab designing electronic materials. Jaime's advisor has a industrial collaboration with a major chemical company. He attends both meetings with his advisor and meetings for a collaborative project he is working with this company. Jaime does experiments in a shared space for part of the week. He has a specific goal for the company that matches his dissertation work with school. One day, Jaime messes up in lab and discard his experimental failure. However, the chemical company that Jaime works with, is very interested in that mess up and at a meeting, the staff mentions that he should try working some of the time to recreate this failed experiment as it could lead to a patent. The company staff also mentions that he should hide these results from his professor.

Case Study #2

Axel's professor is a continual consultant for Big Pharma Co and has managed to secure funding from Big Pharma Co for her students to do research on the drug's impacts. Axel is doing research on a drug produced by Big Pharma Co, evaluating its efficacies. In the past, Axel's research has shown that the drug works as advertised. Big Pharma Co was pleased, and kept sponsoring future research. Axel recently discovered a quite severe negative consequence of using the drug and brought it up with their collaborators. Big Pharma Co decided to no longer fund Axel's project upon hearing this. Axel told their professor, who immediately started brainstorming new projects for Axel, a fifth year student, who was near publication for their current project.

Consequences of Undisclosed Conflicts

- Undermine public trust in scientific integrity, and perceived view of the institution, stakeholders, and individuals.
- Misguided, biased, or wrong research
- Limiting academic creativity and academic exploration

Any others?

Being an Environmentally and Socially Conscious Grad Student

Environmental and Social Dimensions of Engineering

Society demands rapid progress

New technologies have more potential for moral concerns

How do we decide who to benefit? Individuals? Society?

Environmental philosophy

Anthropocentrism - only humans have moral value

Sentient-centered ethics - all things with a nervous system have moral value

Biocentrism - all living things have moral value

Ecocentrism - the whole ecosystem has moral value

Anthropocentrism could cause environmental harm, other views could possibly slow or stop progress on certain scientific fronts

Think about engineering differently

"Thinking of engineering as applied social science redefines engineering from a profession that builds things to one that helps people”

Easy

1. follow the law
2. follow engineering practice

Harder

3. seek out safer designs and practices
4. anticipate misuse of product or process

Sustainability

We must avoid creating a new problem in trying to solve a problem “downstream impacts” of product

Example - asbestos flooring, pipe wrap and shingles, lead paint and pipes. Easy to criticize now but were done in part for fire resistance and durability. This is why we need to think hard about design, lifecycle and do cost benefit analyses.

Some tips if you feel like you're doing work in a bubble

Increase your scientific literacy in fields other than your own.

Work on communicating your ideas to non STEM people and help them recognize "good" from "bad" science (trustworthy sources, conflicts of interest)

Correct misinformation about science in everyday life or on social media (autism is not caused by vaccines etc.)

Volunteer (BASIS)

Get involved in politics(go to city council meetings, Berkeley SPG)

Tips to minimize environmental impact in lab

Copy paper with 100% recycled content, using Energy Star to select a new refrigerator for your breakroom

Shut the fume hood sash! Leaving it open is CO_2 equivalent to driving a car

Use energy Star and get proper maintenance for ultra low temp freezers

Single-pass cooling is restricted by UC policy (huge waste of water) contact Sustainable Berkeley Lab for alternatives (will depend on your building)

Educate yourself on how to properly compost, recycle and dispose of the lab waste you produce. https://sbl.lbl.gov/your-role/

References

Bailey, James. 1965. "A Case History of Failure." Architectural Forum 122(9).

http://sitn.hms.harvard.edu/flash/2017/opinion-socially-conscious-scientist/

https://sbl.lbl.gov/your-role/

Minimizing Data Conflicts

Where can data conflicts arise?

Data Reporting

How you *present your data* to *the world*

1. Present your data
    a. Tables
    b. Graphs
    c. Images

* Usually done pre-publication to better inform key people on the progress of your research

2. The world
    a. PI
    b. Lab group
    c. Collaborators
    d. Sponsors
    e. Journals (editors, reviewers, etc.)
    f. The scientific community at large

Where can data conflicts arise?

Data Sharing

How you *distribute your data* to *the world*

1. Distribute your data
    a. Raw data (text files, images, etc.)

* Usually done post-publication so that others can reproduce and add to your results

2. The world
    a. PI
    b. Lab group
    c. Collaborators
    d. Sponsors
    e. Journals (editors, reviewers, etc.)
    f. The scientific community at large

Content adapted from CITI Program - do not redistribute or copy. Author: Reid Cushman

What are the main causes of data conflicts?

Data Misrepresentation

- Non-reporting or omission of data
- Cherry-picking of data
- Altering or over enhancing image data
- Inaccurately reporting experimental methods

File Drawer Effect

Content adapted from CITI Program - do not redistribute or copy. Author: Reid Cushman

File Drawer Effect

“The extreme view of the ‘file drawer problem’ is that journals are filled with the 5% of the studies that show Type I errors, while the file drawers are filled with the 95% of the studies that show non significant results.” (Rosenthal 1979)

“For any given research area, one cannot tell how many studies have been conducted but never reported.” (Rosenthal 1979)

Rosenthal, R. (1979). The file drawer problem and tolerance for null results. *Psychological Bulletin, 86*(3), 638-641. http://dx.doi.org/10.1037/0033-2909.86.3.638

Why is the File Drawer Effect problematic?

ABSTRACT: Resonant infrared, matrix-assisted pulsed laser evaporation (RIR-MAPLE) is a gentle thin-film deposition technique that combines the facile chemical control of solution processing with the growth control of vapor-phase deposition, yet one that has not been widely applied to crystalline organic–inorganic hybrid materials. In this work, we investigate the optoelectronic quality of RIR-MAPLE-deposited $CH_3NH_3PbI_3$ ($MAPbI_3$) perovskite films and report on the fabrication of perovskite solar cells in which the absorber is deposited by RIR-MAPLE. We find the composition, morphology, and optical properties of these perovskite films to be comparable to those produced by more conventional methods, such as spin coating. The champion device reaches a stabilized power conversion efficiency of over 12%, a high value for perovskite solar cells deposited by a laser ablation process, highlighting the ability of this new technique to prod

Dunlap-Shohl, W. A., Barraza, E. T., Barrette, A., Gundogdu, K., Stiff-Roberts, A. D., & Mitzi, D. B. (2018). MAPbI3 Solar Cells with Absorber Deposited by Resonant Infrared Matrix-Assisted Pulsed Laser Evaporation. *ACS Energy Letters,3*(2), 270-275. doi:10.1021/acsenergylett.7b01144

Why is the File Drawer Effect problematic?

You find the 1 significant results out of 1,000 trials to publish

A success rate of 1/1,000 is not a good representation of the system you are studying

Selective reporting = data misrepresentation

What are the main causes of data conflicts?

Data Misreporting

"Fabrication, falsification, and/or plagiarism (FFP) of data"
(NASEM 2017, pg 78)

Fabrication **Falsification** **Plagiarism**

NEVER EVER is it allowed, acceptable, or moral to FFP data!!!

DO NOT make up, edit, or delete data ever!!!

Let’s think about this morally...

You should not cheat or be fraudulent in your work

Cheating and lying will not benefit you because you will not learn anything factual and you will not learn not to do something correctly

Cheating and lying will not benefit the scientific community because what you report is not actually real

Let’s think about this practically...

This is the digital age, so nothing goes away

It is much easier to track fraud

Just don’t do it

Combining moral and practical thinking

Do not be fraudulent to begin with, but the ease of tracking data fraud should be an even stronger deterrent.

You should report **all** data **as collected**.

Data as collected is still good data, even if it is not what you expect!

The truth benefits the scientific community just as much as significant results.

Dr. Michael Lemieux
@MGLemieux

Early in my PhD, I would spend months repeating an experiment, trying to get the result that I *expected*. Please don't do this! That's doing research backwards. Analyze your data and listen to the story it tells! It's okay if your hypothesis was wrong. @AcademicChatter #phdchat

16:25 · 09 Aug 19 · Twitter for Android

104 Retweets **612** Likes

THE DARK SIDE

How Many Doctored Papers Are Out There?

By **Derek Lowe** | 2 July, 2018

What they found was 59 papers with clear duplications, and in each case the authors were contacted:

> *The 59 instances of inappropriate image duplications led to 42 corrections, 5 retractions and 12 instances in which no action was taken (Table 1). The reasons for not taking action included origin from laboratories that had closed (2 papers), resolution of the issue in correspondence (4 papers), and occurrence of the event more than six years earlier (6 papers), consistent with ASM policy and Federal regulations established in 42 CFR § 93.105 for pursuing allegations of research misconduct. Of the retracted papers, one contained multiple image issues such that a correction was not an appropriate remedy, and for another retracted paper, the original and underlying data was not available, but the study was sufficiently sound to allow resubmission of a new paper for consideration, which was subsequently published.*

Lowe, D. (2018, July 02). How Many Doctored Papers Are Out There? Retrieved from https://blogs.sciencemag.org/pipeline/archives/2018/07/02/how-many-doctored-papers-are-out-there

Interestingly, this paper also records the amount of time all this took, and it's substantial – at least 6 hours of staff time per paper, involving hundreds of emails overall and a lot of back-and-forthing. As usual, cleaning something up takes a lot more time than the act of making it messy in the first place. To that point, the journal introduced pre-publication screening of images in 2013, and the incidence of trouble did indeed decline notably starting in that year. (They didn't tell Elisabeth Bik when the policy was introduced, so as not to bias her).

As those figures show, the good news is that many of the duplicated images appear to be sheer carelessness, and could be fixed. But at least 10% of the paper flagged had to be pulled completely. Extrapolating from this experience (and that of two other journals previously studied) leads to a rough estimate that the 2009-2016 Pubmed literature database (nearly 9 million items) should have about 35,000 papers removed from it completely (and, of course, that means that a lot more papers in it still need to be fixed up). Overall, the number of junk papers can be described as "small but still significant", and there's no reason to have them cluttering up the literature.

"Small but still significant"

Lowe, D. (2018, July 02). How Many Doctored Papers Are Out There? Retrieved from https://blogs.sciencemag.org/pipeline/archives/2018/07/02/how-many-doctored-papers-are-out-there

There is a big timeline of data misconduct

1974

Lugo JD, L. (2015, February 12). The High-Profile Cases of Research Misconduct. Retrieved from https://hubpages.com/education/The-High-Profile-Cases-of-Research-Misconduct

There is a big timeline of data misconduct

1981

There is a big timeline of data misconduct

1985

Notorious Darsee Case Shakes Assumptions About Science

"What kind of protection against fraud does peer review offer? The Darsee affair gives a clear answer: little or none."
Dr. Arnold S. Relman

PERSONAL COMPUTERS

Reaching Out to the System

Broad, W. J. (1943, June 14). Notorious Darsee Case Shakes Assumptions About Science. *New York Times*, p. 2.

There is a big timeline of data misconduct

Mid-to-late 1980s	Robert C. Gallo Thereza Imanishi-Kari
1999	Data Access Act
Early and mid-2000s	Jan Hendrik Schön Hwang Woo-suk

Recent Data Misconduct Issues and Consequences

University Suspects Fraud by a Researcher Who Studied Red Wine

By **NICHOLAS WADE** JAN. 11, 2012

A charge of widespread scientific fraud, involving 26 articles published in 11 journals, was leveled by the University of Connecticut today against Dipak K. Das, one of its researchers, whose work reported health benefits in red wine.

Many of the articles reported positive effects from resveratrol, an ingredient of red wine thought to promote longevity in laboratory animals.

The charges, if verified, seem unlikely to affect the field of resveratrol research itself, because Dr. Das's work was peripheral to its central principles, several of which are in contention. "Today I had to look up who he is. His papers are mostly in specialty journals," said David Sinclair, a leading resveratrol expert at the Harvard Medical School.

The significance of the case seems more to reflect on the general system of apportioning research money. Researchers complain that federal grants are increasingly hard to get, even for high-quality research, yet money seemed to have flowed freely to Dr. Das, who was generating research of low visibility and apparently low quality. The University of Connecticut said Wednesday that it was returning two new grants to Dr. Das, worth a total of $890,000, to the federal government.

Wade, N. (2012, January 11). University Suspects Fraud by a Researcher Who Studied Red Wine. *New York Times*. Retrieved from https://www.nytimes.com/2012/01/12/science/fraud-charges-for-dipak-k-das-a-university-of-connecticut-researcher.html

Recent Data Misconduct Issues and Consequences

"In 2012 the Japanese Society of Anesthesiologists released a rep … nber Yo … 72

Anesthesiologist Fabricates 172 Papers

A researchers in Japan faked patient data on nearly 200 studies over the past 2 decades, according to an investigating committee.

Jul 3, 2012
JEF AKST

WIKIMEDIA, VMENKOV

Yoshitaka Fujii, a Japanese anesthesiologist, may have just set a new record in scientific misconduct. After an investigating committee organized by the Japanese Society of Anesthesiologists concluded that he never saw the patients he claimed to see, or administered the medicine he claimed to treat them with, a total of 172 papers regarding those patients are up for retraction—a record number by a single author, according to *Science*Insider.

National Academies of Sciences, Engineering, and Medicine. 2017. *Fostering Integrity in Research*. Washington, DC: National Academies Press.
Anesthesiologist Fabricates 172 Papers. (2012, July 3). Retrieved from https://www.the-scientist.com/the-nutshell/anesthesiologist-fabricates-172-papers-40780

Recent Data Misconduct Issues and Consequences

Harvard report shines light on ex-researcher's misconduct

By **Carolyn Y. Johnson** Globe staff, May 29, 2014, 8:32 p.m.

10

When former Harvard pyschology professor Marc Hauser was found solely responsible in a series of six scientific misconduct cases in 2012, he distanced himself from the problems, portraying them as an unfortunate consequence of his heavy workload. He said he took responsibility, "whether or not I was directly involved."

Marc Hauser. (GLOBE FILE PHOTO)

But a copy of an internal Harvard report released to the Globe under the Freedom of Information Act now paints a vivid picture of what actually happened in the Hauser lab and suggests it was not mere negligence that led to the problems.

The 85-page report details instances in which Hauser changed data so that it would show a desired effect. It shows that he more than once rebuffed or downplayed questions and concerns from people in his laboratory about how a result was obtained. The report also describes "a disturbing pattern of misrepresentation of results and shading of truth" and a "reckless disregard for basic scientific standards."

Johnson, C. Y. (2014, May 29). Harvard report shines light on ex-researcher's misconduct. *Boston Globe*. Retrieved from https://www.bostonglobe.com/metro/2014/05/29/internal-harvard-report-shines-light-misconduct-star-psychology-researcher-marc-hauser/maSUowPqL4clXrOgj44aKP/story.html

Recent Data Misconduct Issues and Consequences

"...in the **1990s** the Geological Survey of India and Panjab University found that paleontologist **Viswa Jit Gupta had fabricated and falsified data** on fossil discoveries over **more than 20 years** (Jayaraman, 1994).

Articles citing **Gupta's work are still cited**, illustrating that the task of correcting the scientific record can become a long-term undertaking." (NASEM 2017, pg 82)

Broader Research Ethics in Society

What is social responsibility?

An obligation to act in the interest of the public (society)

Image Source: https://www.smallbizdaily.com/top-5-social-responsibility-trends-your-company-should-implement/

Many organizations define ethical codes with social responsibility

National Society of Professional Engineers

Code of Ethics for Engineers

> Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct.

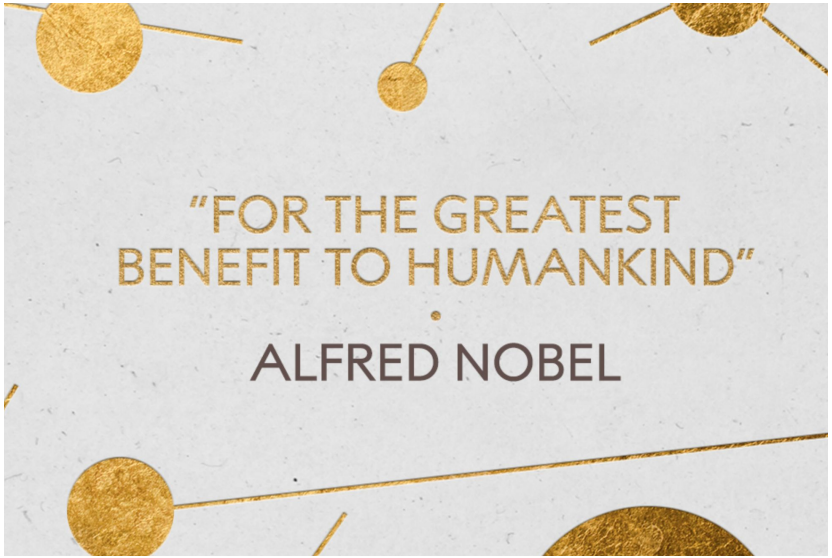
NSPE NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Champion | Guide | Advance | Unite

But what is acting in the “benefit of humankind”?

Not well defined, but some uniting motives:

- Serving public interest
- Advancing the knowledge of science to better inform society
- Conducting research truthfully and responsibly
- Promoting the health & safety of humans and the planet



Why do science researchers have an obligation to society?

1) We have specific, professional knowledge that can be used to understand complex issues which impact society
2) New science & technologies arising from research pose unknown risks for society

"Combined with technical limitations and the complexities of biological systems, making precise predictions about the future of an edited organism and gauging potential risks and benefits might be difficult, if not impossible" (Brokowski & Adli, 2019)

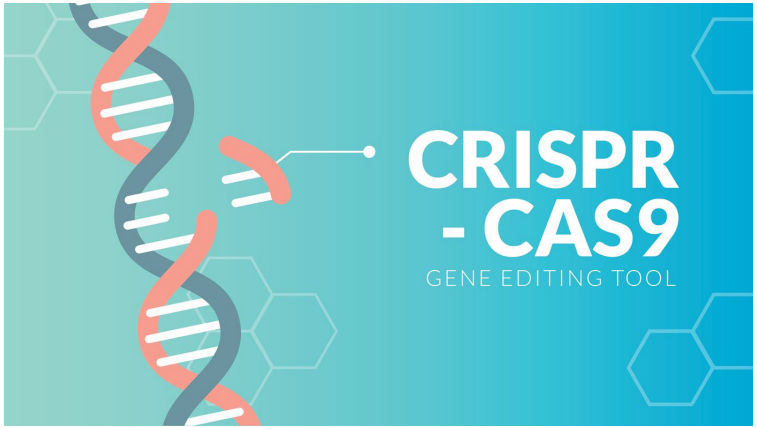


Image Source: https://www.genengnews.com/insights/for-confidence-in-crispr-outcomes-results-must-be-fully-validated/

What we can do as researchers

- Choose research projects which benefit society
- Conduct responsible research as defined by our professional codes
- Educating the public and policy makers about our research
- Join organizations with other researchers to have even greater societal impact

Image Source: https://www.scidev.net/global/policy/news/un-externs-policymakers-science.html

Your research can have long-lasting implications

Technological Momentum: technologies integrated by society have their own inertia and resistance to change

Example:

- Fossil fuels helped enable the Industrial Revolution
- We are fighting centuries of inertia trying to switch to cleaner energy sources

In conclusion

As researchers, we must consider the societal context of our research and act upon our social responsibilities

Research Misconduct Resources

- OSTP 2000: https://ori.hhs.gov/federal-research-misconduct-policy
- Handling research misconduct: https://ori.hhs.gov/handling-misconduct
- Survey on falsification: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0005738
- Mentoring effects from misconduct: https://insights.ovid.com/crossref?an=00001888-200709000-00007

CoI Resources

- Warner, Teddy D., and Laura Weiss Roberts. 2004. "Scientific Integrity, Fidelity and Conflicts of Interest." *Current Opinion in Psychiatry* 17(5):381-5.
- University of California, Conflict of Commitment and Outside Activities: https://www.ucop.edu/academic-personnel-programs/_files/apm/apm-025-07-01.pdf

Data Management Resources

- National Academies of Sciences, Engineering, and Medicine. 2017. *Fostering Integrity in Research*. Washington, DC: National Academies Press.
- National Science Foundation (NSF). 2017. "Dissemination and Sharing of Research Results: NSF Data Management Plan Requirements." Accessed July 23.
- Lowe, D. (2018, July 02). How Many Doctored Papers Are Out There? Retrieved from https://blogs.sciencemag.org/pipeline/archives/2018/07/02/how-many-doctored-papers-are-out-there
- Lugo JD, L. (2015, February 12). The High-Profile Cases of Research Misconduct. Retrieved from https://hubpages.com/education/The-High-Profile-Cases-of-Research-Misconduct
- Cartoon Plagiarism [Cartoon]. (2012). In *ToonPool*.
- Broad, W. J. (1943, June 14). Notorious Darsee Case Shakes Assumptions About Science. *New York Times*, p. 2.
- Wade, N. (2012, January 11). University Suspects Fraud by a Researcher Who Studied Red Wine. *New York Times*. Retrieved from https://www.nytimes.com/2012/01/12/science/fraud-charges-for-dipak-k-das-a-university-of-connecticut-researcher.html
- Anesthesiologist Fabricates 172 Papers. (2012, July 3). Retrieved from https://www.the-scientist.com/the-nutshell/anesthesiologist-fabricates-172-papers-40780
- Johnson, C. Y. (2014, May 29). Harvard report shines light on ex-researcher's misconduct. *Boston Globe*. Retrieved from https://www.bostonglobe.com/metro/2014/05/29/internal-harvard-report-shines-light-misconduct-star-psychology-researcher-marc-hauser/maSUowPqL4clXrOgj44aKP/story.html

Ethics and Society Resources

- AAAS, Scientific Responsibility, Human Rights & Law Program. "Science and the Law: The Brain on Trial." Accessed June 7, 2015.
- American Chemical Society (ACS). 2016. "The Chemical Professional's Code of Conduct." Accessed April 27, 2017.
- American Society for Clinical Laboratory Science. "Code of Ethics." Accessed June 7, 2015.
- American Society of Mechanical Engineers (ASME). 2012. "Code of Ethics of Engineers." Accessed June 7, 2015.
- American Sociological Association (ASA). "ASA Code of Ethics." Accessed June 7, 2015.
- Bird, Stephanie J. 1998. "The Role of Professional Societies: Codes of Conduct and Their Enforcement." *Science and Engineering Ethics* 4(3): 315–20.
- Busby, J. S., and M. Coeckelberg. 2003. "The Social Ascription of Obligations to Engineers." *Science and Engineering Ethics* 9(3): 363–76.
- Carey, David. 2009. "Guatemala's Green Revolution: Synthetic Fertilizer, Public Health, and Economic Autonomy in the Mayan Highland." *Agricultural History*83(3):283–322.
- Editors. 2010. "Putting Gender on the Agenda." *Nature* 465(7299):665.
- Einstein, Albert. 1931. "Speech at the California Institute of Technology, Pasadena, CA." January 15.
- Garland, Brent, ed. 2004. *Neuroscience and the Law: Brain, Mind, and the Scales of Justice*. New York: Dana Press.
- Hesser, Leon. 2006. *The Man Who Fed the World.* Dallas, TX: Durban.
- Martin, Mike W., and Roland Schinzinger. 2005. *Ethics in Engineering.* New York: McGraw-Hill.
- McFarland, Michael C. 1986. "The Public Health, Safety, and Welfare: An Analysis of the Social Responsibility of Engineers." *IEEE Technology and Society Magazine* 5(4):18–26.
- Medecins Sans Frontieres-Doctors Without Borders. 2015. “Home.” Accessed June 7.
- Rangarajan, Mahesh, ed. 2007. *Environmental Issues in India: A Reader*. New Delhi: Dorling Kindersley.
- Simon, John G., Charles W. Powers, and Jon P. Gunnemann. 1972. *The Ethical Investor: Universities and Corporate Responsibility*. New Haven, CT: Yale University Press.
- Society for Neuroscience. 2010. "SfN Ethics Policy." Accessed June 7, 2015.
- Union of Concerned Scientists (UCS). 2015. “Home.” Accessed June 7.