

SCIENTIFIC INTEGRITY

Scientific Integrity

- **Authorship issues**
- **Plagiarism**
- **Falsification or fabrication of scientific data**
- **Conflicts of interest**
- **Ownership of scientific data**

Authorship Issues

When is a person an author? [S. Maloy, website]

Author should make a significant intellectual or practical contribution to the work and should be able to explain and defend the work.

Authorship may be justified if a person plays an important role in:

- * design and execution of an important part of the work
- * analysis of the data
- * interpretation of the results
- * preparation of the manuscript

[some journals specifically list each author's role]

Authorship Issues

When is a person NOT an author? [S. Maloy, website]

Authorship is not justified if a person only:

- * provided funding but did not play other major role in project
- * was group leader but did not play other major role in project
- * provided space or instruments for the project
- * provided technical assistance
- * performed services for a fee

The contributions of someone who is not an author but played one of these roles should be acknowledged in the manuscript.

Authorship Issues

Authorship Order

Different approach in different fields

- * PI first or last (or not at all)
- * alphabetical
- * amount of contribution

Citation Ethics

Grant applications or publications

Essential to cite previous publications

- * background work
- * overlapping results
- * models or ideas

FEDERAL (PHS) POLICY ON RESEARCH MISCONDUCT

Research misconduct: fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.

*** Research misconduct does not include error or honest differences of opinion.**

FEDERAL (PHS) POLICY ON RESEARCH MISCONDUCT

*** Fabrication- making up results & recording/reporting them.**

FEDERAL (PHS) POLICY ON RESEARCH MISCONDUCT

* **Falsification**- manipulating research materials, equipment, or processes, or changing, or omitting data or results so that the research is not accurately represented.

FEDERAL (PHS) POLICY ON RESEARCH MISCONDUCT

* **Plagiarism**- appropriation of another person's ideas, processes, results, or words without giving appropriate credit, including those obtained through confidential review of others' research proposals and manuscripts.

NSF Definition of Scientific Misconduct

- (1) Fabrication, falsification, plagiarism, or other serious deviation from accepted practices in proposing, carrying out, or reporting results from activities funded by NSF; or**
- (2) Retaliation of any kind against a person who reported or provided information about suspected or alleged misconduct and who has not acted in bad faith.**

Plagiarism

From SDSU catalogue [Lindey, A. *Plagiarism and Originality*, 1952] :

*** Formal work publicly misrepresented as original**

*** Any activity wherein one knowingly, directly, and for lucre, status, recognition, or any public gain resorts to the published or unpublished work of another in order to represent it as one's own.**

*** Work shall be deemed plagiarism:**

- (1) when prior work of another has been demonstrated as the accessible source**
- (2) when substantial or material parts of the source have been literally or evasively appropriated (substance denoting quantity; matter denoting qualitative format or style); and**
- (3) when the work lacks sufficient or unequivocal citation so as to indicate or imply that the work was neither a copy nor imitation.**

Plagiarism

From SDSU catalogue [Lindey, A. *Plagiarism and Originality*, 1952.] :

* This definition comprises oral, written, and crafted pieces.

* In short, if one purports to present an original piece but copies ideas word for word or by paraphrase, those ideas should be duly noted.

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- What about “self-plagiarism”?
 - Automated detection of plagiarism.
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Plagiarism

ASSIGNMENT: Within one week:

Provide:

* A one paragraph summary (less than one page) of the article at the following URL:

<http://arstechnica.com/old/content/2007/08/plagiarism-and-falsified-data-slip-into-the-scientific-literature.ars>

* Give relevant citations to the literature, but insure there is NO plagiarism. So, it must be written in your own words.

Falsification or Fabrication of Scientific Data

Universities must investigate!

- * **Whistleblower is the complainant. Whistleblower must make allegations to university official. Whistleblower has certain rights to prevent retaliation.**
- * **Respondent is subject of allegations.**
- * **University must conduct an inquiry, followed by an investigation if warranted.**
- * **Consequences to the respondent and possibly the whistleblower must be determined.**

Falsification or Fabrication of Scientific Data

Universities must investigate!

Research institutions are required to notify the appropriate federal agency if alleged misconduct involves federally funded research:

- * **if the institution's inquiry finds that an investigation is warranted**
- * **if there is an immediate health hazard involved**
- * **if there is an immediate need to protect federal funds or equipment**
- * **if there is an immediate need to protect the interests of the whistleblower or of the subject of the allegations**
- * **if it is probable that the alleged incident is going to be reported publicly**
- * **if there is a reasonable indication of possible criminal violation**

(42CFR50.104(b); PHS, 2000b)

Scientists Behaving Badly

Nature 435, 737-738 (9 June 2005) Brian C. Martinson, Melissa S. Anderson and Raymond de Vries

Table 1 Percentage of scientists who say that they engaged in the behaviour listed within the previous three years (n = 3,247)			
Top ten behaviours	All	Mid-career	Early-career
1. Falsifying or 'cooking' research data	0.3	0.2	0.5
2. Ignoring major aspects of human-subject requirements	0.3	0.3	0.4
3. Not properly disclosing involvement in firms whose products are based on one's own research	0.3	0.4	0.3
4. Relationships with students, research subjects or clients that may be interpreted as questionable	1.4	1.3	1.4
5. Using another's ideas without obtaining permission or giving due credit	1.4	1.7	1.0
6. Unauthorized use of confidential information in connection with one's own research	1.7	2.4	0.8 ***
7. Failing to present data that contradict one's own previous research	6.0	6.5	5.3
8. Circumventing certain minor aspects of human-subject requirements	7.6	9.0	6.0 **
9. Overlooking others' use of flawed data or questionable interpretation of data	12.5	12.2	12.8
10. Changing the design, methodology or results of a study in response to pressure from a funding source	15.5	20.6	9.5 ***
Other behaviours			
11. Publishing the same data or results in two or more publications	4.7	5.9	3.4 **
12. Inappropriately assigning authorship credit	10.0	12.3	7.4 ***
13. Withholding details of methodology or results in papers or proposals	10.8	12.4	8.9 **
14. Using inadequate or inappropriate research designs	13.5	14.6	12.2
15. Dropping observations or data points from analyses based on a gut feeling that they were inaccurate	15.3	14.3	16.5
16. Inadequate record keeping related to research projects	27.5	27.7	27.3

Note: significance of χ^2 tests of differences between mid- and early-career scientists are noted by ** ($P < 0.01$) and *** ($P < 0.001$).

Some Examples of Scientific Fraud

Researcher admits fraud in grant data; Ex-Vermont scientist won nearly \$3m from US; Carey Goldberg and Scott Allen, Boston Globe Staff March 18, 2005

Former University of Vermont researcher Eric Poehlman faces possible prison time (sentenced to 1 year), \$196,000 in fines and restitution, and a lifetime ban on federal funding in what investigators say is the worst US scientific fraud in 20 years. Under a plea agreement, Poehlman will correct or retract 10 published research papers, while admitting to the following:

From 1992 to 2000, Poehlman received \$2.9 million in federal research funding based on fabricated research data intended to make his work sound more promising. He filed 17 fraudulent grant proposals to study the impact of menopause on women's health, the benefits of hormone replacement therapy, and other topics.

Poehlman fabricated test results for all but three of the 35 women in his long-term study of the health effects of menopause, an influential paper indicating that women rapidly lose muscle mass, and gain fat after menopause. The Annals of Internal Medicine retracted Poehlman's findings in 2003 after UVM found evidence of fraud.

Poehlman claimed that hormone replacement therapy helps slow weight gain after menopause based on fabricated data, helping him to win a \$542,000 grant from NIH to continue the studies.

In 2000, Poehlman exaggerated the health damage from menopause in the Vermont Longitudinal Study of Aging. A lab technician found that, when women's blood pressure or cholesterol improved over time, Poehlman would sometimes reverse the dates of the tests to make it seem that their health was declining.

During the UVM investigation of Poehlman's research fraud in 2000-2001, the US attorney in Burlington found that he "destroyed electronic evidence . . . presented false testimony, presented false documents, and influenced other witnesses to provide false documents."

Some Examples of Scientific Fraud

Science 20 January 2006:Vol. 311. no. 5759, p. 335.

Editorial Retraction The final report from the investigation committee of Seoul National University (SNU) (1) has concluded that the authors of two papers published in *Science* (2, 3) have engaged in research misconduct and that the papers contain fabricated data. With regard to Hwang *et al.*, 2004 (2), the Investigation Committee reported that the data showing that DNA from human embryonic stem cell line NT-1 is identical to that of the donor are invalid because they are the result of fabrication, as is the evidence that NT-1 is a bona fide stem cell line. Further, the committee found that the claim in Hwang *et al.*, 2005 (3) that 11 patient-specific embryonic stem cells lines were derived from cloned blastocysts is based on fabricated data. According to the report of the Investigation Committee, the laboratory "does not possess patient-specific stem cell lines or any scientific basis for claiming to have created one." Because the final report of the SNU investigation indicated that a significant amount of the data presented in both papers is fabricated, the editors of *Science* feel that an immediate and unconditional retraction of both papers is needed. We therefore retract these two papers and advise the scientific community that the results reported in them are deemed to be invalid. As we post this retraction, seven of the 15 authors of Hwang *et al.*, 2004 (2) have agreed to retract their paper. All of the authors of Hwang *et al.*, 2005 (3) have agreed to retract their paper. *Science* regrets the time that the peer reviewers and others spent evaluating these papers as well as the time and resources that the scientific community may have spent trying to replicate these results.

Donald Kennedy Editor-in-Chief

Financial Conflicts of Interest

When investigators stand to gain financially several options exist (B. Brody, UAB conference 2001):

- * ban conflicted investigators from participation
- * mandate public disclosure of conflict
- * New Declaration of Helsinki requires that research subjects be told of conflicts of interest
- * NIH adopted internal disclosure as sufficient in 1995 but has recently (2005) adopted more stringent rules for NIH internal employees

Financial Conflicts of Interest

When investigators stand to gain financially several options exist (Baruch Brody, UAB conference 2001):

SUGGESTIONS:

- * consider equity interest, intellectual property rights, income from sponsor (consulting fees, research support, family member conflicts)
- * disclosure should be made to Institutional Review Board, funding agencies, journals, subjects, in presentations and in journal articles
- * take into consideration in subject enrollment

Ownership of Scientific Data

Universities have ownership

- * responsibility typically designated to principal investigator
- * intellectual property rights typically shared by university and investigator
- * where do students and post-docs stand?

Additional Issues from “On Being a Scientist”

- **Selection of Data**
- **Personal Values, Objectivity**
- **Sharing Materials**
- **Errors and Negligence**