



Scientific Misconduct and its Prevention



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The Science Council of Japan

1. Recent Events of Scientific Misconduct

Serious events that violated or may have violated the ethics of conducts of scientific research have occurred recently in both Japan and abroad. Typical examples are presented below. According to the Office of Research Integrity (ORI) in the United States Department of Health and Human Services, over the course of five years (1993-1997) they received approximately 1,000 allegations concerning misconduct in research in the life sciences of which 218 cases were investigated and in 78 cases the misconduct was confirmed

Schoen (Bell Lab) affair (1998-2002)

Schoen, a young German physicist of Bell Lab, reported spectacular findings such as superconductivity and electronic devices that used organic molecular crystals in highly prestigious science journals such as *Science*, *Nature*. He and senior authors received a great deal of attention in scientific circles and the popular press. But too frequent publication and the failure of other scientists to reproduce results aroused suspicion. The coincidence of experimental data in two independent experiments proved unambiguously that the findings had been fabricated. Almost all the papers were withdrawn. An investigation pointed to the lack of an appropriate management system and explored the role of scientific journalism in the affair.

Cold fusion (1989-1991)

Enthusiasm following reports of successful cold fusion at two universities in Utah spread worldwide before the results were carefully examined. The promise of cold fusion was that it could provide unlimited energy with a simple apparatus. It could replace ordinary nuclear fusion that needs huge capital investment and large plants. The enthusiasm was short lived since the findings were false, although there have been additional reports of cold fusion from time to time.

*Original Japanese version was published on June 24, 2003, and its English version was made in May, 2005.

Stone implements from the Old Stone Age in Japan

Implements reputed to be from the Old Stone Age in Japan were excavated. A newspaper crew captured false stone implements being buried at an excavation site on videotape. It turned out that all the remains of the early Old Stone Age were found by a single individual who became very popular in Japan through the mass media. However all the excavations were the results of misconduct. The findings were thought questionable from the beginning in the academic community, but no one could prove it explicitly until the videotape.

Other examples; Gene spy (1999, Japan) and Baltimore, Imanishi-Kari affairs (1986-1996, USA)

In the first case Japanese scientists were suspected of the inappropriate transfer of biological specimens. This introduced new ethical issues relating to international industrial competition, in addition to traditional scientific ethics. In the second case, after a long period the allegation was found to be questionable. But during the intervening period various events occurred including the imposition of penalties. This case promoted the establishment of the ORI in the USA.

2. Present State and Major Issues

(1) Why is the misconduct of scientific misconduct an important issue now?

Scientific misconduct may seriously harm human life and also violate human rights, as science and technology penetrate deeply into daily life with enormous influence. Furthermore, the misconduct damages the trust that society has in science and technology. Therefore, the integrity of scientific research is very important. At the same time, it should be kept in mind that the ethical judgment is often very difficult in modern society.

(2) Typical examples of scientific misconduct

Fabrication, falsification and plagiarism (FFP) are most typical. Inappropriate authorship and citation are other examples.

(3) New ethical issues in science

Misconduct is the deviation from the code of conduct of an organization. Today individuals belong to several organizations simultaneously. The issues may be classified in four categories according to the beneficiary of the organization:

- a) Academic community; beneficiaries are constituting members.
- b) Organization for specific service; beneficiaries are students, patients, clients, etc.
- c) Public organization; beneficiaries are the general public.
- d) Organization for business; beneficiaries are owners of organizations.

The conflict between the codes of different organizations brings about new complicated ethical issues. For example, when one belongs simultaneously to c) and d), the viewpoint of c) encourages him to publicize scientific achievements, but they should be privatized from the standpoint of d).

Competition between organizations belonging to the same categories may also produce new problems. For example, scientists may use exaggerated description in proposals to get big research grants (temptation of rhetoric). Highly sophisticated data processing can be another pitfall for misconduct, as the processing is not transparent.

(4) Trends abroad

The USA launched various measures starting in the 1980's including those in the federal government (e.g., ORI) and other legislation. Most universities and research organizations provide ethical guidelines and formal procedures to deal with misconduct. In Europe, committees on scientific misconduct were established in various countries in the 1990's. In 2002 Beijing University, China, prescribed a code of conduct as well as a procedure for investigation of misconduct.



3. Measures and Proposals

Scientific misconduct damages the progress of science, calls into question the trust that society has in science, seriously influences human life, and may violate the human rights and dignity. It is incumbent on scientists (including engineers) to prevent scientific misconduct. By doing so, the scientific community can fulfill its responsibility to society and can contribute to the establishment of a “society in which scientists are relied on and respected by the people (White Paper of Science and Technology).” Although our effort for the prevention of scientific misconduct might only be the first step in promoting the progress of science and ensuring appropriate scientific practice, let us begin.

The Science Council of Japan, representing the science community of Japan, shall continue its efforts to provide guidelines for scientific conduct and to establish a neutral organization for investigation and judgment of scientific misconduct, and shall promote an ongoing discussion in the scientific community and with the public, in order to prevent scientific misconduct and secure the integrity of scientific activities.

The Science Council of Japan

The Science Council of Japan was established in January 1949 as a special agency under the jurisdiction of the prime minister to promote science in government, industry and everyday life. It represents Japanese scientists at home and abroad with the philosophy that science is the foundation upon which a civilized nation is built.

The Council's mandate is to deliberate on important scientific matters, implement its decisions, and promote the effective exchange of knowledge between researchers to achieve greater productivity in scientific research. Its 210 representative members are elected from approximately 760,000 scientists nationwide and hold office for three years.

When requested, the Council offers advice and recommendations to the government, and has the authority to offer the same on its own initiative.

The Council is very active in the international arena. It is affiliated with academic institutions, sends delegations to major academic conferences and countries with bilateral academic exchange programs, and co-sponsors and supports international conferences in Japan.

The Council strives to reform and innovate jurisdiction, organization and the way of members' recommendation according to "the Amendment of Part of the Science Council of Japan Law" in April 2004 based on *The Ideal Future of The Science Council of Japan*, a recommendation compiled by the Council for Science and Technology Policy in February 2003, advancing the various reform to fulfill its full function as the chief representative of Japan's scientific community.

May 2005
Edited and published by:

Information Service Committee, Science Council of Japan

For further information, please contact:

General Affairs Division, Executive Office, Science Council of Japan
7-22-34, Roppongi, Minato-ku, Tokyo 106-8555, Japan

Phone: +81-3-3403-1906
FAX: +81-3-3403-6224
URL: <http://www.scj.go.jp/>
E-mail: info@scj.go.jp

