Ethical Conduct in Science and Engineering

Ethical Code for Engineers and Scientists
Data Falsification & Fabrication
Plagiarism
Academic Honesty

Adapted from Chemistry-Biology Interface Program Ethics Course and ChE Professional Development Seminar Courses by Prof. Susan Roberts and Prof. Surita Bhatia, Chemical Engineering
AIChE Code of Ethics

• Members of the American Institute of Chemical Engineers shall uphold and advance the integrity, honor and dignity of the engineering profession by:
  – being honest and impartial and serving with fidelity their employers, their clients, and the public;
  – striving to increase the competence and prestige of the engineering profession;
  – and using their knowledge and skill for the enhancement of human welfare.

• To achieve these goals, members shall
  – Hold paramount the safety, health and welfare of the public and protect the environment in performance of their professional duties.
  – Formally advise their employers or clients (and consider further disclosure, if warranted) if they perceive that a consequence of their duties will adversely affect the present or future health or safety of their colleagues or the public.
  – Accept responsibility for their actions, seek and heed critical review of their work and offer objective criticism of the work of others.
  – Issue statements or present information only in an objective and truthful manner.
  – Act in professional matters for each employer or client as faithful agents or trustees, avoiding conflicts of interest and never breaching confidentiality.
  – Treat fairly and respectfully all colleagues and co-workers, recognizing their unique contributions and capabilities.
  – Perform professional services only in areas of their competence.
  – Build their professional reputations on the merits of their services.
  – Continue their professional development throughout their careers, and provide opportunities for the professional development of those under their supervision.
  – Never tolerate harassment.
  – Conduct themselves in a fair, honorable and respectful manner.

http://www.aiche.org/About/Code.aspx
Some Definitions

• **Error**
  – Incorrect data or conclusions due to the limitation of available methods.
  – Error is unconscious.
  – Errors are handled locally and should be acknowledged, preferably in the same journal in which the mistaken information was published.
  – Scientific results are inherently provisional.

http://www.nap.edu/readingroom/books/obas/
• **Negligence**
  – Haste, carelessness, or inattention that leads to work that does not meet the standards demanded in science.
  – Error is preventable.
  – Typically handled locally through the mechanisms of peer review, administrative action, and the system of appointments and evaluations in the research environment.
  – By introducing preventable errors into science, sloppy or negligent research can do great damage—even if the error is eventually uncovered and corrected.

http://www.nap.edu/readingroom/books/obas/
Fabrication, Falsification, Plagiarism

**Misconduct**

- Research misconduct is defined as **fabrication**, **falsification**, or **plagiarism** in proposing, performing, or reviewing research, or in reporting research results.
  
  - **Fabrication** is making up data or results and recording or reporting them.
  
  - **Falsification** is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.
  
  - **Plagiarism** is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.

- Research misconduct does not include honest error or difference of opinion.

- Misconduct is handled externally through institutional procedures.

Case Study 1:
Dealing with suspicions of misconduct:
Data fabrication
Publishing and Reporting Results: What and When

• Publications and research reports should reflect the timely and appropriate release of significant research findings.

• Certain practices make it difficult for reviewer and reader to follow a complete experimental sequence. Among these are:
  – the premature publication or reporting of data without adequate tests of reproducibility or assessments of significance,
  – the publication of fragments of a study, and
  – the submission of multiple similar abstracts or manuscripts differing only slightly in content.

• In a publication or research report, all data pertinent to the project should be reported, whether supportive or unsupportive of the thesis or conclusions. Prior work in the field should be referenced appropriately.

http://books.nap.edu/books/0309047315/html/
Case Study 2:
Expedience, misrepresentation or falsification
Plagiarism

• “The theft or misappropriation of intellectual property and the substantial unattributed textual copying of another's work. It does not include authorship or credit disputes.”

(http://ori.dhhs.gov/html/misconduct/plagiarism.asp)

• The theft or misappropriation of intellectual property includes the unauthorized use of ideas or unique methods obtained by a privileged communication, such as a grant or manuscript review.

• Substantial unattributed textual copying of another's work means the unattributed verbatim or nearly verbatim copying of sentences and paragraphs which materially mislead the ordinary reader regarding the contributions of the author. The limited use of identical or nearly-identical phrases which describe a commonly-used methodology is not plagiarism.

http://books.nap.edu/books/0309047315/html/
Academic Honesty

• “Academic dishonesty is the attempt to secure unfair advantage for oneself or another in any academic exercise.”

• “CHEATING is the use or attempted use of trickery, artifice, deception, fraud and/or misrepresentation of one’s academic work. This includes:
  – copying answers from another student
  – using books, notes, conversations with others, calculators, cell phones and other electronic devices or any other type of external assistance during an examination or other academic exercise without the permission of the instructor
  – collaborating with others on homework, lab reports, computer programs, or other academic assignments without the permission of the instructor
  – obtaining the answers to or a copy of an examination prior to its administration”

• “FABRICATION is the falsification or invention of any information or citation in any academic exercise. This includes:
  – using “invented” information in any laboratory experiment or other academic exercise of research without permission of the instructor
  – altering and resubmitting returned academic work without permission of the instructor
  – misrepresenting the actual source from which information is cited (such as citing a quote from a book review as though it came from the original work)”

http://www.umass.edu/dean_students/code_conduct/acad_honest.htm
Academic Honesty

• **PLAGIARISM** is the representation of the words or ideas of another as one’s own work in any academic exercise. This includes:
  – failing to properly identify direct quotations by quotation marks or appropriate indentation and formal citation
  – failing to acknowledge and properly cite paraphrasing or summarizing material from another source
  – failing to acknowledge and properly cite information obtained from the Internet or other electronic media as well as other sources
  – submitting term papers written by another, including those obtained from commercial term paper companies or the internet

• **FACILITATING DISHONESTY** is knowingly helping or attempting to help another commit any act of academic dishonesty. This includes:
  – substituting for another person in an examination
  – allowing another to copy one’s work in an examination or other academic exercise

• **OTHER PROHIBITED ACTIONS:**
  – submitting all or substantial portions of the same work to fulfill the requirements for more than one course without the prior permission of the instructor(s), including self-plagiarism
  – forging or otherwise altering grades, transcripts, course withdrawal forms, or other academic document
  – illegally accessing a computer hard drive
  – stealing or destroying the academic work of another, such as a computer disk, term paper, or notebook

• “Since students are expected to be familiar with the Academic Honesty Policy and the commonly accepted standards of academic integrity, ignorance of such standards by itself is not sufficient evidence of lack of intent.”

http://www.umass.edu/dean_students/code_conduct/acad_honest.htm
Case Study 3:
Plagiarism on a senior laboratory presentation
Additional Topics for Discussion

- Assigning authorship on academic publications
- Assigning inventorship on patents
- Presenting scientific results and technology in an accurate and unbiased way to the public and to the investment community
- Presenting results of clinical trials in an accurate and unbiased way to the public