Ethics and Keeping Records
CHEM 294
Lab notebooks - legal documents that can be used:
1. To apply for & defend patents
2. To show (non)compliance w/ federal & state laws
3. Simply as record keeping

The laboratory notebook is the basis for your laboratory reports. The language you use in notebooks should be objective, factual, and free of your personal feelings, characterizations, speculation, or other terminology that is inappropriate.
Reading: Do’s & Don’ts of Keeping Lab notebooks

John Doe
2/15/2016

http://techtransfer.tufts.edu/resources/tufts-policies/lab-notebooks/
Reading: Do’s & Don’ts of Keeping Lab notebooks

http://techtransfer.tufts.edu/resources/tufts-policies/lab-notebooks/

Slide from N. Knight
Reading: Do’s & Don’ts of Keeping Lab notebooks
Keeping Records & Ethics

Learning Objectives:

• List rules & guidelines for keeping appropriate laboratory notebooks & records of your research

• Use an understanding of proper record-keeping to create & consider potential improvements in laboratory notebook entries

• Summarize definitions, policies, & procedures of research misconduct

• Examine the allure of FFP and the damage it does to science
Why is it important to keep records **in general**?

- IRS/financial papers
- Warranties
- Family/household records
- Work/business records
- Medical records
- Automobile records
- Notes for exams
Why is it important to keep lab records?

- Are legal documents
- Provide enduring accountability
- Promote research integrity
- Need to be available for grant monitoring & auditing
- Present reliable reference for write-up
What characterizes good record keeping?

- Follows lab notebook guidelines
- Has data management plan for storing data
- Records procedures that allows replication
- Organizes experiments & analyses
- Retains record for future researchers
Data management plans

NSF proposals require plans:

1. Research products
2. Data format
3. Access to data & data sharing practices & policies
4. Policies for re-use, re-distribution, & derivative production
5. Data archiving
Instructions

Write a procedure for tying a shoe lace
Evaluating Laboratory Records

Instructions
Critique grad student examples
Fast 5
Take out a paper and write at least 5 things you learned from the reading.

“Misleading or inaccurate data can thus have far reaching and unpredictable consequences of a magnitude not known before the internet.”
-On being a Scientist, pg 8

How can integrity of research be compromised?

Careful recording and reporting of methods is KEY!!!
Researchers are obligated to:
Use appropriate methods for your area
Design study carefully
Report method accurately and with necessary details
Collect data carefully
Keep proper records

“Misleading or inaccurate data can thus have far reaching and unpredictable consequences of a magnitude not known before the internet.”

-On being a Scientist, pg 8
All scientific research is susceptible to error. At the frontiers of knowledge, experimental techniques often are pushed to the limit, the signal can be difficult to separate from the noise, and even the question to be answered may not be well defined. In such an uncertain and fluid situation, identifying reliable data in a mass of confusing and sometimes contradictory observations can be extremely difficult.
What are UAF’s policies & resources?

Office of Research Integrity

Welcome to the Office of Research Integrity

The University of Alaska Fairbanks (UAF) promotes integrity in research and teaching while ensuring a safe and productive work environment. The Office of Research Integrity (ORI) facilitates the responsible conduct of research through educational, preventive, and service activities. Organizationaly, ORI is located in the Center for Research Services, under the Vice Chancellor for Research. UAF Policies pertaining to the conduct of research may be accessed via the link in the navigation bar at the top right of this page.

Ensuring the integrity of the research record is one of the central goals of responsible conduct in research training. Researchers in all fields rely on others to limit or acknowledge bias and to accurately report their findings. Although the burden for ensuring the integrity of the research record lies predominantly with the researchers themselves everyone involved in the research process, whether they are collaborators, students, technicians, administrators, or volunteers, has a role to play in supporting the responsible conduct of research.

UAF has three research compliance committees who...
What are UAF’s policies & resources?

Ensuring the integrity of the research record is one of the central goals of responsible conduct in research training. Researchers in all fields rely on others to limit or acknowledge bias and to accurately report their findings. Although the burden for ensuring the integrity of the research record lies predominantly with the researchers themselves everyone involved in the research process, whether they are collaborators, students, technicians, administrators, or volunteers, has a role to play in supporting the responsible conduct of research.

<table>
<thead>
<tr>
<th>Research Ethics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Use Permits</td>
</tr>
<tr>
<td>Training Programs</td>
</tr>
</tbody>
</table>

UAF has three research compliance committees who
Keeping good records could prevent scientific misconduct

Holding Up Standards

Slide from N. Knight

http://ccnmtl.columbia.edu/projects/rcr/rcr_misconduct/foundation/
What is scientific misconduct?

Office of Science & Technology Policy definition

"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.”
- 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.”
Example claims of historic fudged data

1. Newton adjusted calculations to fit observations?

2. Mendel changed data during pea plant experiment?

3. Millikan failed to mention eliminated data points when describing electron charge?

4. Pasteur failed to cite he used competitor’s vaccine against anthrax?
RETRACTED: Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

Dr AJ Wakefield, FRCSa, SH Murch, MBb, A Anthony, MBA, J Linnell, PhDa, DM Casson, MRCPb, M Malik, MRCPb, M Berelowitz, FRCPsychc, AP Dhillon, MRCPPatha, MA Thomson, FRCPb, P Harvey, FRCPd, A Valentine, FCRRA, SE Davies, MRCPPatha, JA Walker-Smith, FRCPa

doi:10.1016/S0140-6736(97)11096-0

Referred To

Retraction—Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

The Lancet, Volume 375, Issue 9713, 6–12 February 2010, Page 445

PDF (42 K)

Referred to by

Retraction—Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children

The Lancet, Volume 375, Issue 9713, 6–12 February 2010, Page 445

PDF (42 K)
More recent cases of scientific misconduct

William Summerlin 1974 - “transplanted patches”

John Darsee & Robert Slutsky 1980s - “gift authors”

Jan Hendrik Schön 1998-2002 - made up/changed data ≥ 16 times
Examples of Plagiarism

Authors using portions of an earlier work in a new one without citing original content

Investigators taking ideas from others’ grant proposals/articles during peer-review process for their own publications

Faculty taking dissertation material from students & including it in publications w/o giving due credit

Students taking material from Internet verbatim w/o attribution during research write-ups
Reporting misconduct

- Documentation
- Rules & procedures
- Perspective
- Dispute resolution
- Whistle-blower motivation

Slide from N. Knight
Importance of reporting misconduct

The Need to Act
Gareth Tibbs [Bio]
In the early part of the 20th century, astronomers engaged in a prolonged debate over what were then known as spiral nebulae—diffuse pinwheels of light that powerful telescopes revealed to be common in the night sky. Some astronomers thought that these nebulae were spiral galaxies like the Milky Way at such great distances from the Earth that individual stars could not be distinguished. Others believed that they were clouds of gas within our own galaxy.

One astronomer who thought that spiral nebulae were within the Milky Way, Adriaan van Maanen of the Mount Wilson Observatory, sought to resolve the issue by comparing photographs of the nebulae taken several years apart. After making a series of painstaking measurements, van Maanen announced that he had found roughly consistent unwinding motions in the nebulae. The detection of such motions indicated that the spirals had to be within the Milky Way, since motions would be impossible to detect in distant objects.

Van Maanen’s reputation caused many astronomers to accept a galactic location for the nebulae. A few years later, however, van Maanen’s colleague Edwin Hubble, using a new 100-inch telescope at Mount Wilson, conclusively demonstrated that the nebulae were in fact distant galaxies; van Maanen’s observations had to be wrong.

Studies of van Maanen’s procedures have not revealed any intentional misrepresentation or sources of systematic error. Rather, he was working at the limits of observational accuracy, and his expectations influenced his measurements. Even cautious researchers sometimes admit, “If I hadn’t believed it, I never would have seen it.”
Two young faculty members—Marie, an epidemiologist in the medical school, and Yuan, a statistician in the mathematics department—have published two well-received papers about the spread of infections in populations. As Yuan is working on the simulation he has created to model infections, he realizes that a coding error has led to incorrect results that were published in the two papers. He sees, with great relief, that correcting the error does not change the average time it takes for an infection to spread. But the correct model exhibits greater uncertainty in its results, making predictions about the spread of an infection less definite.

When he discusses the problem with Marie, she argues against sending corrections to the journals where the two earlier articles were published. “Both papers will be seen as suspect if we do that, and the changes don’t affect the main conclusions in the papers anyway,” she says. Their next paper will contain results based on the corrected model, and Yuan can post the corrected model on his Web page.

1. What obligations do the authors owe their professional colleagues to correct the published record?
2. How should their decisions be affected by how the model is being used by others?
3. What other options exist beyond publishing a formal correction?
Recording replicable procedures

Instructions

Trade your procedure for tying a shoe lace
Looking Forward

Lab today: Lab rotation 2
Will: Kiersten, Roger
• Stephanie: Garrett, Tim
  Due CHEM 294: Research topic and mentor preference
  Due CHEM 694: Review paper

Next Week (Feb 22)
Lecture- Surveying Primary Literature
• Reading: Review article
• Due CHEM 294: 1-pg summary of review article
• Due CHEM 294: Lab rotation feedback
• Due CHEM 694: Lab rotation self reflection
  – Due later: review paper
Lab: Literature searching 1