This year's theme is ***Borrowing – Is It Plagiarism?*** We have provided three cases, all of which are applicable for all scientific staff, as well as a set of Comments and Guidelines from the Cases and four relevant attachments that include the government's definition of plagiarism (attachment 2).

Case 1 - Borrowing Results

Dr. Waverly is an NIH Principal Investigator with two postdoctoral fellows, two technicians, a graduate student and a staff scientist in his lab. The lab is investigating the role of oxidative stress in lung cancer. Five years ago the lab examined the effects of mutations in the gene LCG120 related to another disease. Pressed for time, he asks Dr. Ashby, one of the postdocs, to help him review a journal manuscript that analyzes the effects of mutations in LCG120 on the oxidative stress response in the lung. The postdoc reads the article, recommends publication following minor revisions, and provides his comments to Dr. Waverly who thanks him.

- Is it ethical for Dr. Waverly to ask the postdoc to review a manuscript for him?
- How should the postdoc respond to the request?
- Should Dr. Waverly have informed the editor and provided Dr. Ashby's name?
- Should Dr. Waverly have shared his recommendation letter to the journal with the postdoc?

Some weeks later, Dr. Waverly meets with his lab and announces that he would like to begin experiments on a possible link between LCG120, oxidative stress and the development of lung cancer. The postdoc is struck by similarities to the manuscript he reviewed.

- Is it ethical for Dr. Waverly to ask his lab to work on the role of LCG120 mutations in lung cancer?
- Should Dr. Ashby say anything?
- Should Dr. Waverly ask the manuscript authors for permission to begin this work?

The experiments are completed in three months, and the results decrease the novelty of the reviewed manuscript. Dr. Waverly drafts a manuscript to submit to a different journal. The postdoc, who is a coauthor, notices that the manuscript does not acknowledge the authors whose manuscript he reviewed for Dr. Waverly and a PubMed search does not show that this manuscript has been published. Six weeks later Dr. Waverly's manuscript is published. The authors of the original LCG120 manuscript still have not published their research.

- Has Dr. Waverly acted unethically?
- Has he violated any legal rules or guidelines?
- Is this a case of plagiarism?
- What if the original manuscript was written by a former collaborator of Dr. Waverly?
- Should Dr. Waverly share any information on the final decision by the editors with Dr. Ashby?

Case 2 - Borrowing Ideas

Dr. Bigshot is the session chair of a Gordon Conference. During the evening poster session, which takes place in the pub, he visits the poster presented by Mr. Newby, a graduate student in the laboratory of Dr. Compete. Mr. Newby is excited to meet Dr. Bigshot, as he has read his papers and is looking for a lab to do his postdoctoral fellowship. During their conversation, Mr. Newby mentions that he just did a novel bioinformatic search and identified a new protein (FabU) closely homologous to the one (BigD) that made Dr. Bigshot famous, and characterization of FabU was going to be the last part of Mr. Newby's thesis research. When Dr. Bigshot returned to his own lab, he recommended that one of his senior graduate students carry out a bioinformatic search using just the carboxy-terminal domain of BigD as Mr. Newby had done. Several months later, Mr. Newby gets an alert from the Web of Science that Dr. Bigshot, a National Academy Member, just published a characterization of FabU in PNAS, with no mention of Mr. Newby. Mr. Newby is devastated, as he is afraid that he will not be able to publish his most exciting finding.

- Gordon Conferences have no abstract book, and participants are required to sign a statement acknowledging the confidentiality of conference proceedings and discussion. Did Dr. Bigshot violate that agreement?
- Is this a case of plagiarism by Dr. Bigshot?
- Is there any recourse for Mr. Newby?
- Would the situation be different if the conversation took place in a bar at a meeting with no pledge of confidentiality?
- What if the information was included in an abstract for presentation at a meeting at which abstracts are published?

Gordon Research Conferences statement (http://www.grc.org/home.aspx)
To encourage open communication, each member of a Conference agrees that any information presented at a Gordon Research Conference, whether in a formal talk, poster session, or discussion, is a private communication from the individual making the contribution and is presented with the restriction that such information is not for public use. The recording of lectures by any means, the photography of slide or poster material, and printed reference to Gordon Research Conferences papers and discussion is prohibited. Scientific publications are not to be prepared as emanating from the Conferences. Authors are requested to omit references to the Conferences in any publication. Guests are not permitted to attend the Conference lectures and discussion sessions. Each member of a Conference acknowledges and agrees to these restrictions when registration is accepted and as a condition of being permitted to attend a Conference. Although Gordon Research Conference staff will take reasonable steps to enforce the restrictions against recording and photographing Conference presentations, each member of a Conference assumes sole responsibility for the protection and preservation of any intellectual property rights in such member's contributions to a Conference.

Case 3 - Borrowing English

Dr. X, a visiting fellow, is putting together his first paper on his studies of the PrP-Sc protein. He feels somewhat insecure about his ability to write in English, but is excited to be given the opportunity to prepare his paper. To start writing the introduction he has read several papers from his laboratory, one of which has the following introductory paragraph.

One set of neurodegenerative diseases recently linked to ER stress is caused by aberrant metabolism of the widely expressed cell surface glycoprotein PrP. These diseases can be inherited through PrP mutations or acquired via a transmissible agent composed largely of a misfolded isoform of PrP termed PrP-Sc. Exogenous PrP-Sc is capable of converting the normal cellular isoform (PrP-C) into additional PrP-Sc molecules, leading to its accumulation and generating additional transmissible agent. In the familial diseases, PrP mutations appear to cause accumulation of misfolded PrP through poorly understood mechanisms that in some cases also generate PrP-Sc. Thus, altered PrP folding, metabolism, and accumulation are the proximal causes of both familial and transmissible prion diseases. However, the downstream events that culminate in selective neuronal death in any of these diseases are unknown.

Dr. X thinks the paragraph is well written and borrows heavily in the draft he provides his mentor Dr. Z.

Some neurodegenerative diseases recently linked to ER stress have aberrant metabolism of the widely expressed cell surface glycoprotein PrP. These diseases can be inherited through PrP mutations or be acquired via a transmissible agent composed largely of a misfolded isoform of PrP termed PrP-Sc. Exogenous PrP-Sc is capable of converting the normal cellular form (PrP-C) into additional PrP-Sc molecules, leading to its accumulation and generating additional transmissible agent. In the familial diseases, PrP mutations appear to cause accumulation of misfolded PrP through poorly understood mechanisms. Thus, altered PrP folding, metabolism, and accumulation are the causes of both familial and transmissible prion diseases. However, the downstream events that lead to selective neuronal death are not known for any of these diseases.

Dr. Z reads the draft manuscript and then gives Dr. X his comments. Dr. Z thinks Dr. X should completely rewrite the introductory paragraph because it has been plagiarized.

- Do you agree that what Dr. X has done is plagiarism?
- How different do the introductions in different papers from the same laboratory need to be?
- Would it have made a difference if Dr. X had borrowed from a paper from a different laboratory?
- Could Dr. X reuse his own language in his second paper?
- Does it make a difference if text is borrowed in writing the introduction to a paper versus the results or discussion sections?
- How could Dr. X make the paragraphs acceptable?
- Dr. X plans to include a reference to the previous paper – how should he do that? Is this sufficient?
- If Dr. X. were writing a review, would the rules be different?

Comments and Guidelines from the Cases

- Manuscripts submitted for review are considered privileged information unless the data have previously been made public (open meeting, prior abstract publication).

- Material under review should not be copied and retained or used in any manner by the reviewer unless specifically permitted.

- Journal Editors require reviewers to maintain the confidentiality of the research being reviewed. If the reviewer wishes to have a postdoc help with the review, the reviewer should notify the editor and provide the postdoc's name.

- The reviewer should avoid any real or perceived conflict of interest that might arise because of a direct competitive, collaborative or other close relationship with one or more of the authors of the material under review. Normally such a conflict of interest would require a decision not to participate in the review process and to return any material unread.

- Be careful about how/with whom you share data. If the work can be easily reproduced and is not yet ready to publish, show restraint in what you present. The members of the Ethics Committee feel overwhelmingly that no conversation between scientists could be considered "privileged and confidential" unless one of the scientists starts the conversation by stating that what he or she is about to share is unpublished material and is not to be shared with others (see **Attachment 1**).

- Direct copying of sentences, whether from a previous paper of yours or your lab, or from someone else's paper, could be construed as plagiarism, violates the rules of journals, and is considered inappropriate by the NIH (see **Attachments 2 & 3**).

- Be aware that journals are using available technologies to detect similar word patterns (see **Attachment 4**).

Attachment 1

From The NIH Catalyst July-August 1997
Ethics Forum
Silence is not golden: making collaborations work

What is a scientific collaboration? How can one set one up and keep it going successfully? And why do they occasionally go awry?

The NIH Guidelines for the Conduct of Research (just reprinted in a revised third edition and available from your scientific director) accentuate the positive—that "research collaborations frequently facilitate progress and generally should be encouraged." And to help eliminate the negative, the Guidelines suggest setting ground rules at the start and arranging to share reagents with collaborators outside NIH through MTAs (material transfer agreements).

. . .DO NOT ASSUME

THAT LONG PERIODS OF

SILENCE INDICATE THAT

. . . ALL IS WELL. IF

YOU HAVE NOT

COMMUNICATED WITH

YOUR COLLABORATORS

FOR A YEAR, THERE

MAY NO LONGER BE A

COLLABORATION !

But the disputes that can be generated during the course of an otherwise valuable scientific collaboration—disputes revolving around not only reagent sharing but also authorship and even mentorship—are common enough that they are among the central issues the new Ombudsman/Cooperative Resolution Center pilot project was designed to handle.

So what *is* a good collaboration? The NIH Committee on Scientific Conduct and Ethics recently discussed several cases of problem-plagued collaborations and came up with what we hope are useful guidelines. First, in these days of multidisciplinary science, since almost no one is trained in all the disciplines needed to complete a study, scientific collaborations clearly make a lot of sense, both intellectually and financially. The best collaborations form between scientists with complementary expertise—for example, a molecular biologist capable of generating knock-out mice with a neuroscientist who can measure changes in the behavioral activity of those mice; or an immunologist who wants to look at the effect on T lymphocytes of engineered mutants of a virus provided by a virologist.

To work well, though, certain parameters need to be discussed and defined up front: who is going to do what and when they will do it; who will supply reagents needed for certain aspects of the study; even who will write the paper and be first author. Defining order of authorship before doing the experiments can be tricky, however, since surprise results may completely change the focus of a study and thereby dictate a change in the order. Flexibility is thus a key ingredient in any collaboration.

The cases the Ethics Committee examined have convinced us that the single most important measure in successful collaboration is keeping the lines of communication open. Communicate with your collaborators, by phone, e-mail, or even letters, frequently. Tell them what you are finding and ask what their results are. Share data as well as problems. If a collaborator outside NIH is applying for an NIH grant, or is supported by an NIH grant, the granting agency should be informed of this collaboration. You will generally be asked to prepare a letter to be submitted with such a grant application; you should ask to see the relevant parts of the application before it is submitted so that you know whether the proposal accurately represents your part of the collaboration. Although you, as an NIH employee, cannot contribute to the writing of the application, make it clear that you want to be informed when the grant is funded and when it will start. Above all, do not assume that long periods of silence indicate that your collaborator is working away and all is well. If you have not communicated with your collaborators for a year, there may no longer be a collaboration!

Bear in mind that some forms of scientific exchange do not form an appropriate basis for collaboration. The Guidelines state clearly that "individuals . . . who have assisted the research [by providing] reagents . . . should not be authors." By the same criteria, providing someone with a plasmid, or an antibody, or even a transgenic mouse, does not establish a collaboration. In line with this thinking are Public Health Service regulations that state that any reagent developed with government funds (intramurally or extramurally) must be provided to those who request it once the results have been published. Intramural scientists use MTAs when giving such reagents to colleagues at universities or other extramural sites. Such input is often acknowledged in a published study, with thanks to the suppliers of materials used in the experiments—a way to give credit without conferring authorship.

Probably the most difficult issue scientists grapple with in discussing collaborations is that of intellectual property. Is there such a thing as ownership of an idea? If there were, would anyone discuss science with anyone else? Would everyone feel that they deserved authorship or collaborator status because they had lunch with a friend, heard about new results, and suggested an interesting experiment? Conversely, are all conversations between scientists, even one-on-one, to be considered a sharing of privileged information? The members of the Ethics Committee felt overwhelmingly that no conversation between scientists could be considered "privileged and confidential" unless one of the scientists started the conversation by stating that what he or she was about to share was unpublished material and was not to be shared with others.

Many scientists believe that the constraints imposed by industry consultation and collaboration on free and open discussion of research projects are already having a deleterious effect on science. For many of us, the pleasure of doing science lies in formal and informal discussion and exchange of results and ideas with colleagues. That pleasure would be compromised or vanish entirely if each idea were fenced in as the exclusive intellectual property of one person.

Joan P. Schwartz
OIR/OD

Attachment 2

The Office of Research Integrity (ORI) has the following policy on plagiarism (http://ori.dhhs.gov/policies/plagiarism.shtml)

"As a general working definition, ORI considers plagiarism to include both 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.

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. ORI generally does not pursue the limited use of identical or nearly-identical phrases which describe a commonly-used methodology or previous research because ORI does not consider such use as substantially misleading to the reader or of great significance.

Many allegations of plagiarism involve disputes among former collaborators who participated jointly in the development or conduct of a research project, but who subsequently went their separate ways and made independent use of the jointly developed concepts, methods, descriptive language, or other product of the joint effort. The ownership of the intellectual property in many such situations is seldom clear, and the collaborative history among the scientists often supports a presumption of implied consent to use the products of the collaboration by any of the former collaborators."

Self-Plagiarism (taken from an article by *John Dahlberg, Director, Division of Investigative Oversight, ORI*, ORI Newsletter Vol. 15, September 2007)

ORI often receives allegations of plagiarism that involve efforts by scientists to publish the same data in more than one journal article. Assuming that the duplicated figures represent the same experiment and are labeled the same, this so-called "self-plagiarism" does not meet the PHS research misconduct standard. This behavior violates the rules of journals and is considered inappropriate by the NIH.

Attachment 3

From Nature 449:658, 2007
Plagiarism? No, we're just borrowing better English

SIR — The accusations made by arXiv that my colleagues and I have plagiarized the works of others, reported in your News story 'Turkish physicists face accusations of plagiarism' (*Nature* **449,** 8; 2007) are upsetting and unfair. It's inappropriate to single out my colleagues and myself on this issue. For those of us whose mother tongue is not English, using beautiful sentences from other studies on the same subject in our introductions is not unusual. I imagine that if all articles from specialist fields of research were checked, similarities with other texts and papers would easily be found. In my case, I aimed to cite all the references from which I had sourced information, although I may have missed some of them. Borrowing sentences in the part of a paper that simply helps to better introduce the problem should not be seen as plagiarism. Even if our introductions are not entirely original, our results are — and these are the most important part of any scientific paper. In the current climate of 'publish or perish', we are under pressure to publish our findings along with an introduction that reads well enough for the paper to be published and read, so that our research will be noticed and inspire further work.

Ihsan Yilmaz
Physics Department, Çanakkale Onsekiz Mart
University, Çanakkale, Turkey

Attachment 4

From Nature 449:658, 2007
Plagiarism: text-matching program offers an answer

SIR — The removal of almost 70 papers from the arXiv server on suspicion of plagiarism is dismaying (*Nature* **449,** 8; 2007). But, in a similar way to that currently being tested by the cooperative group of publishers CrossRef ('Academic accused of living on borrowed lines' *Nature* **448,** 632–633; 2007), the search technology that led to this removal could be used to reduce future problems. Every paper submitted to arXiv could be examined by a search engine that looks for overlap or correlation with all previous arXiv submissions. If enough of a match is found, a message could be sent to the submitter, listing the work(s) in which similarities have been detected. Should the submitter wish to proceed with their submission, the program would notify the editorial board and trigger an automatic review. The submitter would also be given the chance to explain that the flagged papers were not copied or that the copying was for some reason legitimate. Such a system would address the problem of plagiarism only among papers published in arXiv, but apparently that would already be an improvement. And although plagiarists might opt to copy and translate from foreign-language journals, or simply alter wording enough to pass muster, making it more difficult will at least discourage the lazier offenders. As journals should welcome eliminating plagiarism at the preprint stage before publication, they could support the effort by giving the arXiv site search access to their own full-text databases.

John Bechhoefer
Department of Physics, Simon Fraser University,
Burnaby, British Columbia V5A 1S6, Canada

From Nature 448: 633, 2007
Copycat Trap

Plagiarists should beware. The next time they submit a paper to a journal, a red flag may pop up on the editors' screen warning them that the article's word patterns are suspiciously similar to those of a published paper. A pilot of this computer cop, called CrossCheck, was launched on 1 August by CrossRef, a group of 2,046 scholarly publishers. Commercial software of this kind has been available for some time, but until now subscription firewalls have prevented its use with online literature. CrossCheck is able to access the databases of its member publishers. Six publishers are taking part in the pilot: the Association for Computing Machinery, BMJ Publishing Group, Elsevier, the Institute of Electrical and Electronics Engineers, Taylor & Francis, and Wiley-Blackwell. Like a search engine on the web, the program computes the similarity of word strings to yield an originality score. Suspect scores are flagged-up, and it displays similar excerpts of text from different sources. But an editor will need to examine the flagged up papers to confirm plagiarism. If all goes well, the service could be available as soon as November and other software providers could request access in the future, says Geoffrey Bilder, director of strategic initiatives at CrossRef. Publishers could also get authors to test their

papers before submission, which would spread out the work and allow honest authors to check they hadn't inadvertently 'cut and paste' verbatim, says Bilder. The downside, he notes, is that the program would let hardened plagiarists play the system, by rewording detected passages. "It might just force people to become more sophisticated plagiarists."

Declan Butler