November 9, 2015

Dear Colleagues,

We are delighted you are interested in using this curriculum to facilitate discussions with your colleagues about introducing ethics conversations into their research environments. We hope that these approaches will help make those discussions relevant, engaging, and useful for your colleagues and their trainees.

Curriculum Development: The tools and approaches in this curriculum were developed in collaboration with subject matter experts in the field of research integrity / research ethics / responsible conduct of research (RCR). Our goal was to find content for and approaches to introducing conversations about the ethical dimensions of practice in the research environment. Both content and approach needed to work well across many disciplines and kinds of practice, and be easily integrated into quite varied research environments. Finally, an important consideration was that the impact of the chosen approaches could be meaningfully assessed. Five approaches met these criteria and are included in the curriculum.

Our goal in designing this curriculum as a train the trainer workshop was that participants could use these approaches to facilitate important conversations with their own trainees. It is also plausible that workshop participants could go on to train their peers (e.g., faculty in their department or division, or at a professional association annual meeting workshop, or institutional administrators charged with providing or tracking training in RCR).

Overview of Curriculum: The curriculum has been pilot tested more than a dozen times across 7 institutions and as a pre-conference workshop at the 2014 annual meeting of the American Association for the Advancement of Science. The current curriculum has been refined and redesigned in many ways based on feedback received from workshop participants and the instructors of this train the trainer curriculum.

The curriculum begins with an overview of research ethics – how it has been defined, and why it's necessary to have purposeful, explicit conversations with our trainees about the ethical dimensions of our practice. We then have discussion points about the importance of having ethics conversations in our research environments, rather than relying on the more common classroom and/or online delivery, both of which are divorced from the actual practice of science.

Following the introduction you'll find the five approaches, each with a brief introduction and definition; suggested questions for discussion; and an activity to engage workshop participants.

How to Use the Materials: This workshop is meant to be customized to be relevant for the specific audience and institution. In fact, it is expected that this curriculum will not work well if left unchanged. There are some obviously necessary changes: your institutional logo should be placed on the title page, the instructor biographies should be replaced by your own, and you should cite other research ethics training opportunities at your institution. In addition, we note both here and throughout the instructor's handbook, other changes/suggestions for your consideration.

Workshop Title: There have been other titles used and suggested for this curriculum. You should choose a title that makes sense to you and your audience, and one which is also consistent with the content and purpose of your final version of the curriculum.

Agenda: The tools presented here were initially designed to be presented in a day-long workshop, with approximately an hour spent on each approach, combining interactive discussion and activities for the participants. However, we understand the increasing burdens on our faculty, and a full day workshop may simply not be a possibility for many of those who would otherwise be interested. The course has been taught in an abbreviated fashion, with all topics covered in a half-day workshop; it can also be offered as a half-day session for a few topics, followed by another half day for the remaining topics, or each topic can be offered as a separate seminar in a series. Some institutions are considering teaching the workshop as a series of one hour brown bag lunches. In short, you can and should customize the agenda to best meet your particular environment and needs. This Instructor's Guide is based on a full-day workshop, but examples of one or more additional formats are available along with this guide.

Even if you do choose to present this workshop in a full day, keep in mind that the agenda as presented here is only a guide. Depending on your audience – both size and disciplines represented – you are likely to spend more time on some topics and less on others.

Guiding Discussion: As you conduct the workshop, we cannot stress enough the importance of asking participants for their perceptions of the feasibility and efficacy of using these approaches to engage their trainees in conversations about the ethical dimensions of science and research. Where the participants express doubt about the usefulness of any particular approach, it can be useful to encourage them to articulate perceived limitations and ask for suggestions about how, if at all, to get around them. Throughout the annotated instructor's version of the syllabus you'll find notes to give you as the instructor a bit more background, and tips and resources to help make the discussion more robust.

Resources: The extensive resources section at the end of the syllabus includes citations referenced throughout this guide. We have tried to provide enough resources to supplement the pedagogical material in the curriculum, but not so many that it seems definitive or exhaustive; we encourage you to look through the resource list to find materials you might want to include in your workshop, but we also suggest that you bring in other materials you consider appropriate for the disciplines likely to be represented in your workshop.

This workshop was prepared with the support of National Science Foundation Grant #1135358.
PIs: Michael Kalichman and Dena Plemmons, University of California, San Diego
UC San Diego Research Ethics Program, http://ethics.ucsd.edu

Research Ethics Workshop:

Mentoring for Responsible Research

[DAY]
[DATE]
[TIME]

[YOUR INSTITUTIONAL
OR ORGANIZATIONAL
LOGO(S) CAN BE
PLACED HERE]

Sponsored by
[YOUR INSTITUTION or ORGANIZATION]

For further information about this workshop, contact the authors:

Michael Kalichman, Ph.D.
mkalichman@ucsd.edu
858-822-2027

Dena Plemmons, Ph.D.
dplemmons@ucsd.edu

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Agenda

8:00 am	Registration
9:00	**Introduction and Overview**
9:30	**Codes of Conduct**
10:30	Break
10:45	**Checklists**
11:45	**Cases: Introduction**
12:00pm	Working Lunch: **Cases**
1:00	**Summary of Lunch Discussions**
1:45	**Individual Development Plans / Agreements**
3:00	Break
3:15	**Group Policies**
4:15	**Assessment**
4:30	Closing Summary, Next Steps, Workshop Evaluation
5:00	Adjourn

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Description

NOTES TO THE INSTRUCTOR:

- *In our description of the workshop, we use the term "research faculty" to describe the audience, but you should feel free to change to explicitly include postdocs, graduate students, lab managers, etc., as appropriate for your institution and research environments.*
- *It is important to explicitly re-visit these objectives as you conduct the workshop, for example asking participants, at the close of each section, to actively reflect on what they've just learned.*

This workshop is designed to assist research faculty in creating concrete, discipline-specific strategies to incorporate research ethics education into the context of the research environment. The workshop is grounded in a recognition that many research ethics issues are relevant to the practice of scholarly and creative activities spanning the full range of science, engineering, and technology.

The long-term goal of this workshop is to promote education in the ethical dimensions of research. This educational need is, in itself, an ethical obligation for the research community, and is also increasingly encouraged, if not required, internationally.

Participants will be introduced to rationales, content, approaches, and resources sufficient so that they will have the means to develop and implement research ethics education in their research environment.

Learning Objectives

On successful completion of the workshop, in the context of their particular research environment, participants will be able to:

1. Articulate ***rationales*** for integrating research ethics education
2. List and describe ethics ***topics*** suitable and useful to be addressed
3. List and describe ***approaches*** for integrating research ethics education
4. Design one or more ***activities*** to introduce research ethics

Instructors

NOTES TO THE INSTRUCTOR:

- *Replace these biographies with those of your instructor(s)*

Michael Kalichman, Ph.D.
Director, Research Ethics Program, University of California, San Diego
Adjunct Professor of Pathology, University of California, San Diego
La Jolla, California 92093-0612
858-822-2027; FAX: 858-822-5765
mkalichman@ucsd.edu | http://ethics.ucsd.edu

Kalichman has taught research ethics for over 25 years. He is founding director of the UC San Diego Research Ethics Program (http://ethics.ucsd.edu) since 1997, the San Diego Research Ethics Consortium (http://sdrec.ucsd.edu) since 2006, and the ethics service for the NIH CTSA-funded Clinical and Translational Research Institute since 2010. Kalichman is co-founding director for the Center for Ethics in Science and Technology (http://ethicscenter.net) since 2004. He has taught train-the-trainer, research ethics workshops throughout the U.S. and for groups and institutions in Central America, Africa, and Asia. In 1999, with support from the Office of Research Integrity, he created one of the first online resources for the teaching of research ethics (http://research-ethics.net). He leads NIH- and NSF-funded research on the goals, content, and methods for teaching research ethics. Internationally, he has had significant roles in a collaboration between the AAAS and the China Association of Science and Technology (CAST), co-chairing the working group for RCR education at the 2010 Singapore meeting of the World Conference on Research Integrity, and assisting Korean leaders in setting a national research ethics agenda.

Dena Plemmons, Ph.D.
Research Ethicist, Research Ethics Program
University of California, San Diego
La Jolla, California 92093-0612
858-752-9585

Plemmons, an anthropologist, is a research ethicist with the UCSD Research Ethics Program and the San Diego Research Ethics Consortium. Plemmons leads seminars and train the trainer workshops on research ethics, and teaches courses to help NIH and NSF grantees meet requirements for training in the responsible conduct of research. Her work in research ethics has ranged from consulting in Ghana, Mexico, and Taiwan on research ethics curricula to serving as 2009-2011 Scientist in Residence for ethics and science education at the Montgomery Middle School in San Diego. Plemmons was part of a small U.S. delegation with the AAAS to meet with counterparts from the China Association of Science and Technology in September 2012 to promote dialogue between scientists socialized in the U.S. and Chinese cultures about the ethical dimensions of the practice of science. In early 2013, she served as one of the hosts for a delegation from South Korea who came to UC San Diego for a weeklong series of programs and meetings to inform their plans for national approaches to research ethics. Plemmons was elected a AAAS Fellow in 2012, and served as Chair of the Committee on Ethics of the American Anthropological Association for four years, leading the task force that reviewed and revised the Association's code of ethics. She received the President's Award in 2011 for her work on behalf of the Association.

What is Research Ethics?

NOTES TO THE INSTRUCTOR:

- *The purpose of this section is not to be a lecture defining "research ethics," but to be a conversation for the purpose of developing a shared understanding of the purpose and focus of this workshop.*

The subject of this workshop is research ethics. The focus is a very practical one: How should we, as researchers, act?

Unfortunately, the choices we face are not always clear. And even those cases that are clear may at times be better characterized as "right vs. right" rather than "right vs. wrong." For these reasons, our obligation is not necessarily to make the right decisions, but to strive to make the best possible decisions. In this context, "ethics" should not be confused with ethical theory, morality, and/or simply following the rules.

While there are many possible formulations for the scope of *research ethics*, one useful summary for the purpose of this workshop is to focus on our obligations as researchers. Those obligations might be summarized to include research, other researchers, and society, but also a fourth overarching responsibility in all cases to ask questions:

1. *Research:*
   How should research be conducted so as to meet our obligations to preserve and promote the integrity of research findings?

2. *Researchers:*
   How should researchers interact with one another to meet our obligations to other researchers?

3. *Society:*
   How should researchers interact with the larger communities, academic and public, to meet our obligations to the society in which we live and work?

4. *Asking Questions:*
   How, when, and where should researchers be prepared to ask questions about the conduct of science so as to meet their obligations to the research, researchers, and society?

NOTES TO THE INSTRUCTOR:

- *The "examples of other topics" in the list below is not meant to be exhaustive nor definitive. You should feel free to shrink or expand this list as appropriate for and relevant to your audience.*
- *It is also your choice how to use this list. You may decide that having this (or any other) list included in the participant materials will cut off avenues of discussion; you might prefer to invite your participants to create a list of topics covered under the "research ethics" heading. At the conclusion of the workshop, you could then send the generated list to your participants, or you might have this (or any other) list as an appendix that you then distribute to your participants at the conclusion of the discussion.*

What topics are covered under the heading of "Research Ethics"?

Topics recommended by NIH	**Examples of other Topics**	
Conflict of Interest	Conflicts of Commitment	Communication with the public
Human and Animal Subjects	Conflicts of Conscience	Perceptions of public
Mentoring	Duplicate publication	Scientists as activists
Collaboration	Plagiarism	Censorship
Peer Review	Sabotage	Deception
Data Management	Use of statistics	Asking Questions
Research Misconduct	Image manipulation	Dispute Resolution
Authorship and Publication	Reproducibility	Dependence on funding
Scientists and Society	Bias: Causes, protections	Managing budgets
	Credit	Stem cells
	Open access	Dual use technology
	Page charges	Any major scientific discovery
	Ghostwriting	
	Managing a research group	…Other?

Why Teach Research Ethics?

NOTES TO THE INSTRUCTOR:

- *Having a conversation about the purpose for teaching research ethics at all is essential to identifying what should be done to meet those goals. Again, this should not be a lecture, but a conversation to identify goals that resonate with the participants.*

Many who believe we *should* teach research ethics have a clear idea of *why* we should do so. However, even a moment's reflection reveals *many* possible motivations for such teaching. Based on a series of interviews with teachers of research ethics, the range of possible goals was numerous and diverse (Kalichman and Plemmons, 2007). And the many possible outcomes vary greatly along dimensions such as importance, feasibility, and measurability. An understanding of this range of possible goals is a precursor to making good choices about not only what might be done to teach research ethics, but what is worth doing.

Other than meeting federal, institutional, and/or departmental requirements for teaching research ethics, what should our goals be?

- ***Enhance*** public perception of the research community?
- ***Protect*** the interests and welfare of the human and animal subjects of research?
- ***Improve*** choices of research to be pursued and research outcomes?
- ***Decrease*** Research Misconduct?
- ***Decrease*** disputes and misunderstandings?
- ***Increase*** responsible conduct in research (RCR)?
- ***Increase*** knowledge about RCR?
- ***Increase*** moral or ethical decision-making skills? Other skills?
- ***Increase*** positive attitudes and disposition for RCR? Moral sensitivity?
- ***Increase*** conversations about these issues?

While these goals are clearly distinguishable from one another, there is also considerable overlap. For example, an intervention designed to increase knowledge might at the same time meet departmental requirements for teaching research ethics.

Mentoring in the Research Environment

NOTES TO THE INSTRUCTOR:

- *This conversation can be brief, but it is important to be sure before moving on that the participants understand the nature of what is meant by "mentoring in the research environment," as this is the heart of the workshop.*

Teaching research ethics in the context of the research environment is widely understood to be an important and necessary adjunct to courses or on-line modules (Whitbeck, 2001; Fryer-Edwards, 2002; Davis, 2006; Kalichman, 2014; Peiffer et al., 2008), the premise being that one of the best approaches for teaching research ethics "is to teach about the ethical dimensions of science in the places where we do our science" (Plemmons and Kalichman 2013). The rationale for this curriculum is that by having conversations about research ethics in the research environment, researchers can:

1. *Learn by example:*
   researchers have the opportunity to learn by observing how others address ethical challenges.
2. *Learn by doing:*
   researchers can learn through the experience of addressing ethical challenges in the context of performing their research.
3. *Learn in place:*
   researchers can see how what they do is intertwined with the norms and standards of practice in their particular research discipline.
4. *Learn what is most important:*
   researchers can learn about the specifics that are most important to their particular practice of research rather than the much longer list of everything that is potentially relevant to other areas of research.
5. *Continue to learn:*
   working in a research group is an ongoing opportunity for continuing education, and addressing new and evolving issues that might not otherwise be covered in courses.

Teaching in the research environment is nominally synonymous with mentoring. One of the most important mechanisms by which knowledge is passed from one generation to the next is through good mentoring. In the sense that a mentor is an individual who has succeeded by overcoming the hurdles to success, he or she is in the best position to help a trainee with facing those same hurdles.

The presumption is that research mentors are in an ideal position to convey standards of conduct. Unfortunately, some data show that such mentoring is infrequent or even non-existent (Brown and Kalichman, 1998; Swazey and Anderson, 1996). Although such mentoring often does not occur explicitly, that does not mean an absence of socialization into science. Clearly, trainees do learn something about their ethical obligations and responsibilities by doing and observing. This may result in sufficient education, but the worry is that this ad hoc approach risks that the lessons learned will be too little, too late, or wrong. This curriculum is meant to supplement that ad hoc approach to teaching and learning about the standards of scientific conduct.

In addition to encouraging faculty to make good use of one-on-one scheduled mentor/mentee meetings and "teachable moments" in the context of research (e.g., something in the news, a recent academic publication, an experiment gone unexpectedly downhill, an unkind and unhelpful peer review of a manuscript),this workshop is designed to help research mentors identify and take advantage of the opportunities presented by those activities that are normal and frequent occurrences in the research context/environment.

While research training environments vary greatly, many of those opportunities to introduce discussion about research ethics issues can be identified for any given research group or discipline. Some examples of what we here consider the research context or the research environment to be are:

- Ad hoc conversations
- Research group / lab meetings
- Journal clubs
- Research lecture or seminar series
- Brown bag lunches

Each of these research training environments presents tremendous opportunities for education, and there are numerous tools that might be adopted to promote thoughtful discussion and learning about research ethics. We are proposing in this curriculum five such tools to complement ad hoc discussions in "teachable moments":

1. Reviewing professional Codes of Conduct
2. Following a Checklist of mentoring responsibilities
3. Discussing historical, current, or fictional Cases that illustrate research ethics challenges
4. Adopting mentor-trainee Individual Development Plans outlining mutual roles and responsibilities
5. Defining and adopting research group Policies regarding one or more aspects of responsible conduct of research

These tools are easily adapted to at least some research contexts. For example, cases would likely work better in seminars, while group policies might be more appropriate to lab or similar group settings.

Codes of Conduct

NOTES TO THE INSTRUCTOR:

- *The exercise included in this section is crucial to the proposed approach for using codes of conduct. As you register faculty for the workshop, ask them to locate and bring an appropriate code of ethics/conduct for the workshop discussion. We [MK and DP] have found it helpful to have done this ourselves as instructors, as well; DP is an anthropologist, and the concerns articulated in her profession's Principles of Professional Responsibility (PPR) were both different and similar enough to facilitate good discussion.*
- *This section concludes with numerous possible questions. This is both to provide the participants with different approaches they might take in using codes of conduct and to allow the workshop instructor and participants to address those questions of particular interest and relevance. The list is not meant to be covered in its entirety.*
- *In response to question #6, it was suggested in an earlier workshop that students could be assigned particular sections of their code, and that one could spend 10-15 minutes relating the code to what has just been discussed in a lab meeting, journal club, data meeting, or brownbag lunch. More generally, you should encourage workshop participants to come up with other ways to use the code of their profession.*

Nearly all scientists work within a discipline that is represented by a professional society, association, or organization. Most of these groups have created documents defining what it means to be a member of that particular discipline. These ***Codes of Conduct*** might include aspirational statements about values and principles and/or specific guidance about, for example, criteria for authorship. Finding, reading, and discussing such codes are an opportunity to reflect on professional responsibilities.

Exercise

Each workshop participant should bring a copy of a professional code of conduct most appropriate to the practice of her or his profession. If they do not know of a code, then they can check the Illinois Institute of Technology website (http://ethics.iit.edu/ecodes/bibliography). If still unable to find an appropriate code, the workshop instructor can propose a surrogate.

Participants will be asked to explain their respective codes.

Questions for Discussion

1. What is similar among the codes presented?
2. What is different?

3. To what extent is it possible to understand key elements of codes from a discipline different than your own?
4. Are the differences due to differences between disciplines, or an oversight on the part of one of the codes?
5. Do codes from disciplines different than your own contain elements that might be translatable to your own discipline?
6. How might such codes be appropriate for encouraging discussion in your research setting?
7. When/where should trainees be introduced to their professional code(s)?
8. How might the code be used to illustrate practice in your discipline?
9. Does your code make certain practices sound easier than they actually are in practice?
10. How consistent is your code with actual practice in your discipline, and how do you have effective conversation with your trainees about any disconnects?
11. What is the purpose of codes in general? In your particular discipline/organization?
12. Do you have any sense of 1) whether others are aware of the existence and/or content of your code, and 2) how other people view your code – other professions? The community?

Checklists

NOTES TO THE INSTRUCTOR:

- *Checklists can be useful as reminders to have conversations about diverse aspects of the conduct of responsible research. In teaching about checklists, you should ideally focus on the kinds of topics most appropriate to your audience. In all cases, you will have two primary questions to answer: (1) What should be covered on the checklist? and (2) When should the checklist be used? Three examples of this are shown below.*

Checklist	*What*	*When*
Recordkeeping	*Expectations for lab notebooks, passwords for electronic data, forms of data checking*	*When trainees first arrive*
Authorship	*Criteria for authorship, order of authorship, responsibilities of authors*	*When everyone arrives OR With group of potential authors when writing of manuscript begins*
Regulations	*What institutional and federal regulations govern your research*	*When members of group first arrive*

- *There is a natural fit between checklists you might create with your trainee for specific research practices, and those you might create in the form of an individual development plan (IDP) or contract, which is one of the modules suggested for this curriculum. Here is an example of a document that bridges the checklist/IDP divide:*

  http://ukrio.org/wp-content/uploads/UKRIO-Recommended-Checklist-for-Researchers.pdf.

- *Further, there is a somewhat looser fit between checklists and group policies, also an optional module for this curriculum, with the latter perhaps deriving from the former. Here's an example of an instrument which might be characterized as a checklist/policy hybrid:*

  https://www.apa.org/science/leadership/students/authorship-determination.pdf

Much of teaching about research ethics can be handled effectively through one-on-one mentoring on an *ad hoc* basis. The fact that this happens all too rarely may simply be a matter of being overlooked. An easy solution is to create a reminder checklist for items particularly important to cover (e.g., see Gawande, 2011) as well as stages of training when those items might best be covered. A terrific example of how a checklist can be used in this way is the "Checklist for Research Students and their Supervisors at the University of Oxford" (2014). The goal is to ensure that practical issues will be addressed at appropriate times when training members of the research team.

The use of checklists as a tool for teaching about research ethics has many applications. So much of what we do as experienced researchers is done by rote; we no longer have to consciously think about what comes next. This is not true for our trainees.

While the material to be covered in a checklist will vary by discipline, some topics likely to be important for trainees in any discipline include the following:

1. Criteria for authorship
2. Recordkeeping
3. Standards for sharing
4. Ownership of materials (including plagiarism)
5. Risks of bias and how they can be addressed
6. Roles and responsibilities for mentors and trainees
7. Risks and benefits of collaborations
8. Writing of grants or protocols
9. Conflicts of commitment
10. Asking questions, consensus building, and whistleblowing

Checklists can be used not only as a reminder of key responsibilities, but also as detailed steps for particular tasks. For instance, this could be the steps necessary to do a specific experiment, or the steps necessary to calibrate a particular piece of equipment, or the expected elements to be to written in a lab notebook, or both the ethical and regulatory items to be addressing in securing Institutional Review Board approval for a study with human subjects. Examples of some of these uses are included among the resources for Checklists.

An optional tool to help in preparing a checklist is the "Checklist for Checklists" (2010) prepared by "Project Check" for the creation of medical checklists. As they note, the checklist is not a teaching tool or algorithm per se, though it can be useful to use with your trainees as a way to collaboratively develop a lab-wide checklist of responsibilities to be covered or reviewed.

Questions for Discussion

1. Are other items missing from the above list that are likely to be important for most if not all disciplines?
2. What items might you want to add specific to your focus in science and engineering?

Exercise

- What, if anything, would be important to know in your research group about each of the above items?
- *When* would those items be best addressed?

Draft Checklist

Item	When to address?
1.	
2.	
3.	
4.	
5.	

Cases

NOTES TO THE INSTRUCTOR:

- *You should feel free to choose your own case for this section, or choose several, giving each small group a distinct case to discuss. Given the time constraints of both this workshop and most lab meetings, it would be best for the cases to be relatively uncomplicated, though still nuanced.*
- *While this curriculum provides a basic case analysis scheme, if you use case analyses regularly, you likely know there are several ways of analyzing cases, and many frameworks out there to assist your students, depending on how you use / what you want the students to learn from using the cases. Some of those are included in the resources section of this curriculum; you could provide a couple of different evaluation schemas to determine if one is more appropriate for a particular discipline, or career stage, than another.*
- *If you're using an agenda which includes an over-lunch discussion of a case, as the agenda in this instructor's manual shows, we used the 15 minute window just before lunch to go over the case studies section of the syllabus, coming back to the question "How might cases be introduced into the research environment?" in the after-lunch discussion.*
- *It is important that the larger group discussion about the case(s) not become simply a discussion of the case per se, but that it also include a conversation about how useful this kind of discussion can be with their students. We found that our groups were eager to discuss the elements of the case, but we had to explicitly articulate the usefulness of such case discussions as tools for integrating ethics into their research environments.*
- *You might also ask your workshop participants if other kinds of "cases" – those drawn from current events, for instance, or those written as "two minute challenges" [https://nationalethicscenter.org/resources/146/download/2MC%20methodology.pdf] – might also work in the research environment.*
- *One of the evaluators of an earlier version of the curriculum noted that these workshops "could include tips on how to identify and choose in-the-news cases, challenges in discussing them, and bringing closure to such discussions. Of course an in-the-news case discussion would be modeled in the workshop as well. Alternatively, the workshop could promote the idea of providing case study (either created or found) discussion in a context similar to a journal club, or even as an occasional event in existing journal clubs." This underscores the idea we had when creating this curriculum that all of those venues are considered "the research environment."*

What are case studies?

Based on real or contrived scenarios, case studies are a tool for discussing scientific integrity. Cases are designed to confront the readers with a specific problem that does not lend itself to easy answers. By providing a focus for discussion, cases help researchers to define or refine their own standards, to appreciate alternative approaches to identifying and resolving ethical problems, and to develop skills for dealing with hard problems on their own.

How should cases be analyzed?

Many of the skills necessary to analyze case studies can become tools for responding to real world problems. Cases, like the real world, contain uncertainties and ambiguities. Readers are encouraged to identify key issues, make assumptions as needed, and articulate various options for resolution. In addition to the specific questions accompanying some cases, an effective analysis will typically address the following criteria:

- *Interests*
  Who is affected (individuals, institutions, a field, society)? What significant interest(s) (material, financial, ethical, other) do those affected have in the situation? Which interests are in conflict?
- *Principles*
  What specific, generalizable, and consistent principles (e.g., to tell the truth, to do no harm) are applicable to this case?
- *Alternate answers*
  What other courses of action are open to each of those affected? What is the likely outcome of each course of action? What actions could have been taken to avoid the conflict?
- *Defensible*
  Are the final choice and its consequences defensible in public (e.g., reported through the media)?

Is there a right answer?

- *Acceptable Solutions:*
  Most problems will have several acceptable solutions or answers, but a single perfect solution often cannot be found. At times, even the best solution will have unsatisfactory consequences.
- *Unacceptable Solutions:*
  While more than one acceptable solution may be possible, not all solutions are acceptable. For example, obvious violations of specific rules, regulations, or generally accepted standards of conduct would typically be unacceptable. However, it is also plausible that blind adherence to accepted rules or standards would sometimes be an unacceptable course of action.
- *Ethical Decision-making:*
  Ethical decision-making is a process rather than an outcome. The clearest instance of a wrong answer is the failure to engage in that process. Not trying to define a consistent and defensible basis for decisions or conduct is unacceptable.

How might cases be introduced into the research environment?

Cases are best seen as an opportunity to foster discussion among several individuals. As such, they might be most appropriate as an exercise to be used in the context of a research group meeting, journal club, or as part of a research lecture series.

Exercise

During the lunch break, workshop participants will be assigned to small groups for the purpose of reviewing a case (scenario) describing a research ethics challenge. Ideally discussion group participants should be from diverse disciplines and people who do not already know one another well. This will increase the chance to better see challenges and find solutions for the case being reviewed. It also hopefully serves to increase personal connections among diverse members of the institution who can turn to one another with future ethics and ethics training questions or challenges.

Case for Discussion

How much is too much?

Qiao Zhi has recently arrived to work as a postdoctoral research in the United States from China. She studied English for many years as part of her schooling in China, but she had little real world experience in conversing and writing English. Qiao Zhi is a very talented scientist in her field and quickly found a position in a research group, largely consisting of other Chinese researchers and with Professor Wang, who was trained in China as well. During her first year of work, Qiao Zhi was extraordinarily lucky to have made an interesting finding and Professor Wang encouraged her to write the work up for publication in the journal *Science*. Qiao Zhi struggled to write the paper in English, but soon found that with the help of the Internet she could easily find phrases written well in English to express concepts that she wasn't sure of. Professor Wang lightly edited the paper written by Qiao Zhi, they submitted it to *Science*, and it was accepted for publication. Six months later, one of Wang's colleagues was looking at the Déjà vu website (http://dejavu.vbi.vt.edu/dejavu) and discovered that Qiao Zhi's paper received a very high score for using text duplicated from other papers. Wang took the concern of possible plagiarism to the Research Integrity Officer (RIO) at his institution. The RIO appointed a committee to determine if Qiao Zhi should be found guilty of plagiarism, an example of research misconduct. You are a member of that committee and have been asked to decide whether frequent use of phrases from other papers is plagiarism and if doing so should result in sanctions or penalties.

Recommended timetable:

During lunch:

- *Introductions (5 mins):*
  Introduce yourselves to one another, pick someone to serve as discussion leader (responsible for keeping discussion on track and on time), and someone to keep a written summary of key conclusions. If not all members of the group have already been introduced to the case, the group leader should read the case aloud.
- *Case Discussion (20 mins):*
  Collectively consider the (1) interests of individuals and groups in how this case is handled; (2) ethical principles or values at stake; (3) the alternative answers that might be considered as solutions; and (4) the rationales for selecting a particular choice of action agreeable to all.
- *Summary (10 mins):*
  As a group, figure out how best to articulate your findings of interests and principles that are at stake, the alternative answers to be considered, your recommended answer, and the rationale for choosing that answer.

After lunch

- *Presentation (~ variable)*
  Choose one member of your group to present your analysis, paying attention not just to the case *per se*, but also how this kind of exercise could be beneficial for your trainees.

Individual Development Plans/AgreementsXX

NOTES TO THE INSTRUCTOR:

- *While these are often characterized as "mentor-trainee contracts," the focus should be less on what they are called, and more on how creating or using these kinds of documents can help educate our trainees in or about RCR.*
- *There are certainly several good IDP instruments already available, primarily targeting post-doctoral trainees. We argue here, however, whether already existing or newly created, and whether for post-docs or graduate students, an IDP can be useful even if the focus is not particularly on what we think of as RCR. It is, in fact, this aspect of these instruments that is so crucial. What we might think of as simply scientific practice actually has ethical implications, and while we're training our post-docs/graduate students about these practices in general, we can also discuss the ethical implications.*
- *Many of these tools – the FASEB IDP, and the myIDP in Science Careers -- are easily adapted to those discussions. For instance, myIDP has one rather brief section focusing specifically on RCR, and includes the following elements:*
    - *Careful recordkeeping practices*
    - *Understanding of data ownership/sharing issues*
    - *Demonstrating responsible authorship and publication practices*
    - *Demonstrating responsible conduct in human research*
    - *Demonstrating responsible conduct in animal research*
    - *Can identify and address research misconduct*
    - *Can identify and manage conflict of interest*

  However, the other sections also contain elements of "RCR". For example, under Research Skills, they have the skills of "navigating the peer review process"; "interpretation of data"; and "statistical analysis." Under Professionalism, they include "complying with rules and regulations." The entire sections of Communication and Management and Leadership Skills are full of elements considered typical RCR topics, as well as some that should be part of our discussions of ethical practice in research [e.g., time management].
- *What is presented here is really just a bare-bones example of an instrument meant to be created between a trainee and his/her PI, and used as a jumping off point for conversations about RCR, specifically, and the ethical dimensions of our work, broadly. Alternatively, you could go through each element of the myIDP on screen and have each participant talk about the relevance of any particular item to their practice and how they would relate that practice to the responsible conduct of research.*

Increasingly, various science organizations have proposed agreements or "individual development plans" (IDPs) to spell out mutual obligations for mentors and postdocs (AAMC, 2008a) and mentors and graduate students (AAMC, 2008b). The value of such agreements is summarized in a widely cited manual for training of graduate students (University of Michigan, 2011):

> *Departments can affirm that mentoring is a core component of the educational experience for graduate students by developing a compact or agreement, relevant to the discipline or field of study, for use by faculty and the students with whom they work. Such a document would list the essential commitments and responsibilities of both parties, set within the context of the department's fundamental values. This could be included in the departmental handbook and reviewed—or even signed—by both parties to acknowledge the mentoring relationship.*

The Federation of American Societies for Experimental Biology (FASEB) provides on their website an IDP for postdocs, which is not only a template for planning one's career, but also "serve[s] as a communication tool between individuals and their mentors" (http://www.faseb.org/portals/0/pdfs/opa/idp.pdf). Additionally, Science Careers has "myIDP" (http://myidp.sciencecareers.org), a tool which also includes skill, interest and values assessments, and provides a very useful framework for thinking through the ethical implications of our scientific practice. The presumption is that such plans/agreements/instruments will open channels of communication and serve as a reminder of mutual roles and responsibilities for a successful training experience.

Discussion Questions

1. Which of the sample development plan items (next page) is/are appropriate to your discipline?
2. Would such a development plan be useful or counterproductive in promoting responsible conduct?

Exercise

Using the sample plan as a starting point, design an IDP for your research group. In doing so, consider:

What should be changed? Deleted? Added?

How and when would you use such an agreement?

Present your draft agreement to the workshop participants.

Sample Development Plan

Student	Mentor/Advisor
1. If in doubt, ask.	1. If in doubt, ask.
2. Meet with advisor once each ______.	2. Meet with student individually once each ______.
3. With mentor, define milestones for research and dissertation.	3. With trainee, define milestones for research and dissertation.
4. Request performance evaluations once each ______.	4. Provide performance evaluations once each ______.
5. Perform self-evaluation once each ______.	5. Request student self-evaluation once each ______.
6. Strive to meet expectations for recordkeeping, data ownership, sharing of data, credit, and authorship.	6. Provide guidance for expectations about recordkeeping, data ownership, sharing of data, credit, and authorship.
7. Maintain research records sufficient for others to reconstruct what was done.	7. Review original research records once each ______.
8. Pursue opportunities for professional development (e.g., writing, speaking, mentoring, learning and teaching about research ethics).	8. Propose opportunities for professional development (e.g., writing, speaking, mentoring, learning and teaching about research ethics).
9. Comply with government and institutional guidelines and regulations for the conduct of research.	9. Provide adequate information about relevant government and institutional guidelines and regulations for the conduct of research.
10. If e-mail communication is breaking down, schedule an in-person meeting.	10. If e-mail communication is breaking down, schedule an in-person meeting.

Group Policies

NOTES TO THE INSTRUCTOR:

- *While policies potentially incorporate many of the elements considered as part of Checklists or Individual Development Plans (IDPs), they are distinctive in that they set general guidelines or expectations defining how researchers should act in a given group or setting. Especially if a workshop includes Checklists, IDPs, and Policies, it is important to have a discussion at some point to define similarities and differences among the three approaches.*

Misunderstandings and disputes among researchers are much more frequent than actual Research Misconduct (Martinson et al., 2005; Martinson et al., 2010). While some of these challenges may be unavoidable, many could be mitigated simply by clear and early communication. One way to meet this goal is by developing policy documents covering such issues as authorship or data management.

Sample Policy

Authorship Policy

Criteria for authorship:
To be included as an author on a paper, it is necessary to have made a substantial and new contribution essential to publication of the paper, to provide a good faith contribution to writing and/or editing of the manuscript, and to approve the content of the version submitted for publication.

Criteria for acknowledgement:
Contributions to the publication of a manuscript that do not meet the criteria for authorship should be recognized in the acknowledgements section of the paper.

Order of authorship:
If a paper has more than one author, and assuming all authors meet the "Criteria for authorship," then the first author will typically be the person who wrote the first draft of the manuscript, the last author will be the head of the research group, and authors listed in between will be listed in order of decreasing contributions to the project.

Disputes about authorship:
If anyone believes that someone proposed to be an author, or someone left off of the list of authors, has been not been given credit appropriate to their contributions, then they should raise their concerns with the head of the research group, who has ultimate responsibility within the group for decisions about allocation of credit.

Appeals to decisions about authorship:
In the event that the above guidance is insufficient to resolve a dispute about authorship, then the interested parties should each draft an anonymized version of their perspective

on the issues at stake. These summaries will then be submitted to a mutually agreeable third party for a decision based on binding arbitration. If no clear decision is rendered, then a final decision will be made by a flip of a coin (or the equivalent if multiple competing options are proposed).

Examples of Possible Topics for Policies

- Dealing with particular human or animal subjects
- Recordkeeping
- Data management, including discussions of statistical methods, and registering research questions and data analysis plans before a project begins
- Data Sharing
- Contacts with media

Questions for Discussion

1. What topics might be appropriate for a group policy in your area of research?
2. Is it possible to have a policy that would be meaningful and not counterproductive?

Exercise

1. Identify a topic for a policy of common interest to all participants in the workshop.
2. Propose possible elements to be covered in the policy.
3. Select those elements for which there is agreement, and draft wording for the proposed policy.
4. Design an implementation plan for this policy.

Assessment

NOTES TO THE INSTRUCTOR:

- *This section is designed to be brief, but it is nonetheless important. The key point to be made is that workshop instructors, as well as faculty participants, should recognize the importance of assessing the impact of their efforts.*
- *The criteria for choosing assessment goals were developed by the participants in the original consensus conference that ultimately culminated in the creation of this workshop curriculum.*
- *To help support those interested in assessing impact, examples are provided of approach and content for assessment tools used in the creation of the curriculum.*

Mentoring, as with other forms of teaching, is intended to produce a positive impact. However, that impact is not guaranteed. For this reason, effective teaching is defined in part by assessing whether goals have been met.

Criteria for choosing assessment goals

Choosing among the many possible outcomes and measures should begin with whether a particular outcome meets appropriate criteria, such as:

1. ***Important:*** The goal should address something that is particularly relevant (***important***) to the ethical or responsible conduct of science.
2. ***Deficient:*** Some things that are important may not in fact be lacking. The goal should address something that needs improvement or correction because it is ***deficient***.
3. ***Independent:*** Even if something is important and deficient, it could be secondary to some other goal. Meeting the goal should be ***independent*** of first needing to meet other goals.
4. ***Amenable to Intervention:*** Even if something is important and deficient, we may have no realistic way to repair that deficit. The goal should be something for which we have, or we could reasonably produce or acquire, an ***intervention*** that would enable us to make a change.
5. ***Measurable:*** It is possible that there is something that we can change by intervention that is both important and deficient, but we have no means to assess our impact. The goal should be something for which we have the tools for defining ***measurable*** outcomes. [NOTE: Measurable outcomes can also include qualitative findings. The key is to have something credible to convince ourselves and others that there is some value added because of our efforts.]
6. ***Magnitude:*** It is possible that there is something that we can change by intervention that is important, deficient, and measurable, but the magnitude of our impact might be too small to be considered cost effective. The goal should be something for which we can produce a change of sufficiently large ***magnitude***.
7. ***Feasible:*** Even if something reasonably meets all of the above criteria, it may not in fact be practical or feasible in the research environment because of the amount, type and availability

of resources required or because of the characteristics of the research environment. The goal should be something that is ***feasible***.

Assessment Plan for this Curriculum

One example of an assessment strategy is what was done for this workshop during its development. The items below could readily be adopted or modified for assessing future iterations of this workshop curriculum and/or the impact of faculty adoption of one or more of the approaches proposed in the workshop. If workshop instructors or faculty participants are interested in using either approach, contact Michael Kalichman or Dena Plemmons for access to the surveys used on SurveyMonkey.

Faculty Feedback

Prior to the workshop and six months after the workshop, faculty could be asked to complete a brief (2-3 minutes) online survey. Although names and e-mail addresses would be used to invite their participation in the survey, identifying information can be de-coupled from the data and not be part of any analysis, summary, or publication.

In addition to feedback on which of the proposed approaches were attempted, two primary questions to be answered are:

1. Do you perceive that the proposed approaches are feasible, relevant, and effective?
2. Do you have observations or experiences consistent with the presumption of a positive impact?

Student Feedback

Prior to the workshop and six months after the workshop trainees could be asked to complete a brief (2-3 minutes) online survey. Although trainee names and e-mail addresses would be used to invite participation in the survey, their identifying information can be de-coupled from the data and not be part of any analysis, summary, or publication.

In addition to feedback on which of the proposed approaches were attempted, the two primary questions to be answered are:

1. Do the students perceive that the proposed approaches are relevant and effective?
2. Do the students report outcomes consistent with the presumption of a positive impact?

The content of the surveys used is summarized on the following two pages.

Faculty Feedback Questions

1. During the most recent academic term, which of the following strategies did you use as a basis for discussion with one or more of your trainees (graduate students and/or post-docs)?

Strategy	Yes / No
Code of ethics or conduct for your research profession	
Items on a checklist of research ethics topics	
A real or fictional case to demonstrate research ethics issues	
An Individual Development Plan establishing responsibilities for you and your students	
A group policy addressing research ethics issues	

2. For each of the above strategies that you used:
   A. Did you use this strategy in the context of a group meeting (e.g., journal club, discussions of data or research strategies) and/or one-on-one?

   Using a scale of agree/neutral/disagree, please rate the following statements:
   In my particular research group, this strategy for teaching research ethics is
   B. Feasible (it can be done)
   C. Relevant (it is meaningful to our practice of research)
   D. Effective (it helps to promote research integrity)

   A. How many trainees are part of your research group?
   Graduate students _____ Post-docs ________

   B. Over the most recent academic term, how many hours did you discuss research ethics issues with one or more of your trainees (graduate students and/or post-docs)?

In the context of:	Hours
One or more of the proposed strategies?	
Other conversations?	

3. Please note any observations you've had that speak for or against the effectiveness for your research group of any of the above strategies you have used.

4. Please share with us any other strategies, whether purposeful or ad hoc, you have successfully used to generate discussions about research ethics in your research group.

5. Please provide any other comments you may have.

Student Feedback Questions

1. During the most recent academic term, which of the following strategies did your research mentor use as a basis for discussion with you?

Strategy	Yes / No
Code of ethics or conduct for your research profession	
Items on a checklist of research ethics topics	
A real or fictional case to demonstrate research ethics issues	
An Individual Development Plan establishing responsibilities for your research mentor and you	
A group policy addressing research ethics issues	

2. For each of the above strategies that your research mentor used:
   A. Did your mentor use this strategy in the context of a group meeting (e.g., journal club, discussions of data or research strategies) and/or one-on-one?

   Using a scale of agree/neutral/disagree, please rate the following statements:
   In my particular research group, this strategy for teaching research ethics is
   B. Relevant (it is meaningful to our practice of research)
   C. Effective (it helps to promote research integrity)

3. Over the most recent academic term, how many hours did you discuss research ethics issues:

With:	Hours
Your research mentor?	
Others?	

4. If the number of hours in question 3 was >0, then what impact, if any, did those conversations have on you?

5. Could you briefly describe any other approaches your mentor has used to generate discussions about research ethics in your research group?

6. Please provide any additional comments you may have.

Next Steps

NOTES TO THE INSTRUCTOR:

- *The purpose of this section is to increase the chances that workshop participants will actually carry out some of what they have learned in this workshop.*
- *Depending on institutional culture and your preferences as an instructor, this concluding segment may be more or less directive in its outcomes.*
- *One approach, based on the content below, is to challenge participants to take 3-5 minutes to jot down a list of things they will try to do next, including target dates for completion. For many reasons, these ideas might be very preliminary (e.g., review some of the resources on the following pages before deciding which if any of the approaches to adopt) or very specific (e.g., spend 5 minutes in each of the next 6 monthly journal clubs to discuss one of the elements of the relevant professional code of conduct)*
- *Also, please keep in mind your own evaluation of the workshop on the day it is conducted. A sample evaluation form is appended at the end of this document. You should of course modify the form based on your particular workshop plans. Because it may be useful to workshop participants to keep a copy, you may want to do as we did which is to leave the sample form at the end of the syllabus and print a separate copy to be completed by workshop participants on the day of the workshop.*

Before concluding the workshop, we would like to meet two final goals.

First, for the benefit of all participants, it would be valuable to hear what steps, if any, you plan to take now. Please use the space below to jot down some ideas of what you are considering, and perhaps a realistic timeline.

Next Steps	**Target Date**

Second, we want to conclude by ensuring that you have a network of peers to share ideas and experiences. Some of these peers can of course be the people in this room. However, you can also find some useful connections as well as many other useful resources at:

- Online Ethics Center for Engineering and Science, National Academy of Engineering: http://www.onlineethics.org
- Ethics CORE: http://nationalethicscenter.org
- Resources for Research Ethics Education: http://research-ethics.net

Recommended Resources

NOTES TO THE INSTRUCTOR:

- *While this section shouldn't be considered exhaustive, it does provide many starting points for what has been covered in the workshop. Because participants may not realize its importance, it is worth a moment at the end of the workshop to underline the overall value of this section and to specifically cite examples particularly relevant to your version of the workshop.*

The purpose of this section on readings is to provide a starting point for further information about the teaching of research ethics or responsible conduct of research, particularly in the context of the research environment. While all of the resources listed are recommended, this list is not intended to be comprehensive. Resources recommended as a starting point are written in **bold**.

Contents

Selected Resources: By Topic

Recommended Starting Resources are in **bold.**

Agreements/IDPs

1. AAAS (2015). MyIDP. Science Careers. http://myIDP.sciencecareers.org
2. **AAMC (2008a): Compact Between Postdoctoral Appointees and Their Mentors. https://www.aamc.org/initiatives/research/postdoccompact**
3. **AAMC (2008b): Compact Between Biomedical Graduate Students and Their Research Advisors. https://www.aamc.org/initiatives/research/gradcompact**
4. FASEB. Statement on Including Postdoctoral Mentoring Plans in Research Grant Applications. http://www.faseb.org/portals/0/pdfs/opa/QReports/July-Sept08/MentoringRGrants.pdf
5. **FASEB: Individual Development Plan for Postdoctoral Fellows. http://www.faseb.org/portals/0/pdfs/opa/idp.pdf**
6. Hobin J, Fuhrman CN, Lindstaedt B, Clifford PS (2012): You Need a Game Plan. Science Careers. http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2012_09_07/caredit.a1200100
7. UK Research Integrity Office. Checklist for Researchers. http://ukrio.org/publications/checklist-for-researchers
8. University of Michigan (2014): Appendix 1. Compact Between Postdoctoral Appointees and their Mentors, Handbook for Postdoctoral Fellows. http://www.rackham.umich.edu/downloads/PostdocHandbook.pdf
9. University of Wisconsin: Mentees Individual Development Plans Overview, Resources for each phase of the mentoring relationship. https://mentoringresources.ictr.wisc.edu/MenteeIDPOverview

Assessment and Goals

1. **Antes AL, Murphy ST, Waples EP, Mumford MD, Brown RP, Connelly S, Devenport LD (2009): A Meta-Analysis of Ethics Instruction Effectiveness in the Sciences. Ethics Behav 19(5):379-402.**
2. **Elliott D, Stern JE (1996): Evaluating Teaching and Students' Learning of Academic Research Ethics. Science and Engineering Ethics 2:345-366.**
3. Frankel MS (2003): Developing a Knowledge Base on Integrity in Research and Scholarship, Phi Kappa Phi Forum 83(2): 46-49.
4. Heitman E, Olsen CH, Anestidou L, Bulger RE (2007): New Graduate Students' Baseline Knowledge of the Responsible Conduct of Research. Academic Medicine. 82(9):838-845.

5. **Kalichman M (2013): Why do we teach research ethics? Proceedings from National Academy of Engineering Workshop on Practical Guidance on Science and Engineering Ethics Education. pp. 5-16.**
6. Kalichman MW, PJ Friedman (1992): A pilot study of biomedical trainees' perceptions concerning research ethics. Academic Medicine 67: 769-775.
7. **Kalichman MW, Plemmons DK (2007): Reported Goals for Responsible Conduct of Research Courses. Academic Medicine 82(9): 846-852.**
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9. Nightingale P, Te Wiata I, Toohey S, Ryan G, Hughes C, Magin D (1996): Assessing learning in universities. Sydney: Professional Development Centre, University of New South Wales.
10. Plemmons DK, Kalichman MW (2007): Reported Goals for Knowledge to be Learned in Responsible Conduct of Research Courses. Journal of Empirical Research on Human Research Ethics 2(2):57-66.
11. Powell S, Allison MA, Kalichman MW (2007): Effectiveness of a Short-term Course in the Responsible Conduct of Research for Medical Students. Science and Engineering Ethics 13(2): 249-264.
12. Schmaling KB, Blume AW (2009): Ethics instruction increases graduate students' responsible conduct of research knowledge but not moral reasoning. Accountability in Research 16:268–283

Cases

1. American Association for the Advancement of Science (1996): Scientific Integrity Videos, Information available online at. http://www.aaas.org/spp/video
2. **Bebeau MJ with Pimple KD, Muskavitch KMT, Borden SL, Smith DH (1995): Moral Reasoning in Scientific Research: Cases for Teaching and Assessment. Indiana University. http://poynter.indiana.edu/teaching-research-ethics/tre-resources/moral-reasoning**
3. Elliott D, Stern JE (1997): Research Ethics - A Reader. University Press of New England, Hanover, NH.
4. **Cases and Scenarios, Online Ethics Center for Engineering and Research, National Academy of Engineering. http://www.onlineethics.org/Resources/Cases.aspx**
5. Ethics CORE (2015): Ethics and Responsible Conduct of Research (RCR) Resources. http://nationalethicscenter.org
6. Herreid CF: National Center for Case Study Teaching in Science, State University of New York at Buffalo. http://ublib.buffalo.edu/libraries/projects/cases/case.html

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8. **Macrina FL (2014): Scientific Integrity: An Introductory Text with Cases. 4th edition, American Society for Microbiology Press, Washington, DC.**
9. National Academy of Sciences (2009): On Being a Scientist: Responsible Conduct in Research. 3rd Edition. Publication from the Committee on Science, Engineering, and Public Policy, National Academy of Sciences, National Academy of Engineering, and Institute of Medicine. National Academy Press, Washington DC. http://www.nap.edu/catalog.php?record_id=12192
10. Penslar RL, ed. (1995): Research Ethics: Cases and Materials. Indiana University Press, Bloomington, IN.
11. **Pimple KD (2002): Using Small Group Assignments in Teaching Research Ethics, The Poynter Center, Indiana University, Bloomington. http://poynter.indiana.edu/files/1013/4851/8317/kdp-groups.pdf**
12. **Pimple KD (2007): Using case studies in teaching research ethics. http://poynter.indiana.edu/files/2113/4849/7612/kdp-cases.pdf**
13. **Schrag B, ed. (1996): Research Ethics: Cases and Commentaries, Volumes 1-6, Association for Practical and Professional Ethics, Bloomington, Indiana. http://www.onlineethics.org/cms/15333.aspx**

Checklists

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2. **Gallagher K (2012): The Use of Checklists in Research, Inside Higher Ed, October 21, 2012. https://www.insidehighered.com/blogs/gradhacker/use-checklists-research**
3. **Gawande A (2011): The Checklist Manifesto: How to get things right. Picador.**
4. Perez-Sindin X (2012): 10-Point Checklist to Write a Good Research Proposal, posted at http://xaperezsindin.com/2012/10/23/what-is-a-good-research-formulatingaresearch/
5. http://www.projectcheck.org/uploads/1/0/9/0/1090835/checklist_for_checklists_final_10.3.pdf
6. Texas A&M University, Division of Research. Investigator Self-Assessment Checklist for Human Subjects Research. http://rcb.tamu.edu/humansubjects/resources/pi_selfassessment_humansubjectsresearch
7. UK Research Integrity Office. Checklist for Researchers. http://ukrio.org/publications/checklist-for-researchers
8. **University of Oxford (2014): Research Integrity and the Responsible Conduct of Research Checklist for Research Students and their Supervisors at the University of**

Oxford. https://www.learning.ox.ac.uk/media/global/wwwadminoxacuk/localsites/oxfordlearninginstitute/documents/overview/rsv/Integrity_checklist_August_2014.pdf

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Codes of Conduct

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2. Bullock M, Panicker S (2003): Ethics for all: Differences across scientific society codes. Science and Engineering Ethics 9(2):159-170.
3. Center for the Study of Ethics in the Professions (2012): Codes of Conduct Collection. http://ethics.iit.edu/research/codes-ethics-collection
4. Davis M (1999): Writing a Code of Ethics. Perspectives on the Professions. 19 (1).
5. **Davis M (2007): Eighteen Rules for Writing a Code of Ethics. Science and Engineering Ethics 13(2):171-189.**
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Group Policies

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3. Nosek B, Spies JR, Motyl M (2012): Scientific Utopia: II. Restructuring Incentives and Practices to Promote Truth over Publishability, Perspectives on Psychological Science. 7(6): 615-631.

4. **Schreier AA, Wilson K, Resnik D (2006): Academic Research Record-Keeping: Best Practices for Individuals, Group Leaders, and Institutions. Academic Medicine 81(1):42–47.**

5. **Stanford University: Research Policy Handbook. http://doresearch.stanford.edu/policies/research-policy-handbook**

6. University Court (2011): Research data management policy. University of Edinburgh. http://www.ed.ac.uk/information-services/about/policies-and-regulations/research-data-policy

General Resources

General Web Resources

1. **Ethics Core Digital Library (National Center for Professional and Research Ethics). http://nationalethicscenter.org**
2. Making the Right Moves (Howard Hughes Medical Institute). http://www.hhmi.org/resources/labmanagement/moves.html
3. **Online Ethics Center (National Academy of Engineering). http://onlineethics.org**
4. Project for Scholarly Integrity (Council of Graduate Schools). http://www.scholarlyintegrity.org
5. **Resources for Research Ethics Education (UC San Diego). http://research-ethics.net**
6. Responsible Conduct of Research (RCR) for Postdocs (National Postdoctoral Association). http://www.nationalpostdoc.org/publications/rcr
7. Singapore Statement on Research Integrity. 2nd World Conference on Research Integrity, 2010. http://www.singaporestatement.org/statement.html

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5. Harris CE, Pritchard M, Rabins M (2008): Engineering Ethics: Concepts and Cases 4e. Wadsworth Publishing, Belmont CA.
6. Israel M, Hay I (2006): Research Ethics for Social Scientists. Sage Publications, Thousand Oaks.
7. Kovac J (2003): The Ethical Chemist: Professionalism and Ethics in Science. Prentice Hall.
8. **Macrina FL (2014): Scientific Integrity, ASM Press, 4th ed., Washington, D.C.**
9. **National Academies of Science (2009): On Being a Scientist: A Guide to Responsible Conduct in Research. http://www.nap.edu/catalog.php?record_id=12192**
10. Oliver P (2003): The Student's Guide to Research Ethics. Open University Press, NY.
11. Penslar RL, ed. (1995): Research Ethics: Cases and Materials. Indiana University Press, Bloomington.

12. Pritchard MS (2006): Professional Integrity: Thinking Ethically. Univ. Press of Kansas.
13. Shamoo AE, Resnik DB (2002): Responsible Conduct of Research, Oxford Univ. Press, NY.
14. Steneck NH (2004): ORI Introduction to the Responsible Conduct of Research. http://ori.hhs.gov/ori-intro
15. Steward C N (2011): Research Ethics for Scientists: A Companion for Students. Wiley-Blackwell, Oxford

Research Ethics Internet Courses

1. Responsible Conduct of Research (University of Pittsburgh). https://cme.hs.pitt.edu/servlet/IteachControllerServlet?actiontotake=displaymainpage&site=rpf
2. Responsible Conduct in Research Instruction (Eastern Michigan University): http://www.rcr.emich.edu
3. Responsible Conduct of Research (CMDITR). https://nationalethicscenter.org/rcrtutorial
4. Responsible Conduct of Research (Columbia). http://ccnmtl.columbia.edu/projects/rcr

Courses for Research Ethics Instructors

1. Teaching Responsible Conduct of Research (RCR) Certificate program: National Center for Professional and Research Ethics. http://ethicscenter.csl.illinois.edu/teaching-rcr

Fostering Integrity in Research

1. IOM (2002): Integrity in Scientific Research: Creating an Environment That Promotes Responsible Conduct. National Academies Press, Washington, DC. http://www.nap.edu/catalog.php?record_id=10430
2. Kalichman MW (2007): Responding to challenges in educating for the responsible conduct of research. Academic Medicine 82(9): 870-875.
3. Martinson BC, Anderson MS, DeVries R (2005). Scientists Behaving Badly. Nature 435, 737-738 (9 June 2005) | doi:10.1038/435737a; Published online 8 June 2005
4. Martinson BC, Crain LA, De Vries R & Anderson MS (2010). The Importance of Organizational Justice in Ensuring Research Integrity. JERHRE, 67-83

Integrating Ethics in the Curriculum or Discipline

1. Bebeau MJ (2002): Influencing the Moral Dimensions of Professional Practice: Implications for Teaching and Assessing for Research Integrity. In: Steneck NA and Scheetz MH (eds.): Proceedings of the First ORI Research Conference on Research Integrity. Office of Research Integrity, Washington, DC pp. 179–187.

2. Collaborative Development of Ethics Across the Curriculum Resources and Sharing of Best Practices, University of Puerto Rico at Mayaguez. http://cnx.org/lenses/eactoolkit/eactoolkit

3. **Davis M (2004): Five Kinds of Ethics Across the Curriculum. Teaching Ethics 4(2):1-11. http://ethics.iit.edu/publication/Davis_Five_Kinds_of_Ethics.pdf**

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5. Drake M, Griffin P, Kirkman R, Swann J (2005): Engineering Ethical Curricula: Assessment and Comparison of Two Approaches. Journal of Engineering Education 94:223-231.

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7. Teaching Ethics Across the Engineering Curriculum, Michael Davis, Illinois Institute of Technology. http://www.onlineethics.org/cms/8924.aspx

Mentoring and Responsible Conduct

1. **Anderson MS, Horn AS, Risbey KR, Ronning EA, DeVries R & Martinson BC (2007): What Do Mentoring and Training in the Responsible Conduct of Research Have To Do with Scientists' Misbehavior? Findings from a National Survey of NIH-Funded Scientists. Academic Medicine 82(9):853-860.**

2. Anderson MS, Louis KS (1994): The graduate student experience and subscription to the norms of science. Res Higher Ed 35:273–99.

3. Brown S, MW Kalichman (1998): Effects of training in the responsible conduct of research: A survey of graduate students in experimental sciences. Science and Engineering Ethics 4(4): 487-498.

4. Eastwood S, Derish P, Leash E, Ordway S (1996): Ethical issues in biomedical research: Perceptions and practices of postdoctoral research fellows responding to a survey. Science and Engineering Ethics 2: 89-114.

5. Fryer-Edwards K (2002). Addressing the Hidden Curriculum in Scientific Research. American Journal of Bioethics, 2(4): 58-59.

6. Kalichman M (2014). A Modest Proposal to Move RCR Education Out of the Classroom and into Research. Journal of Microbiology & Biology Education, 15(2), 93–95. http://doi.org/10.1128/jmbe.v15i2.866.

7. Peiffer AM, Laurenti PJ, Hugenschmidt CE (2008). Fostering a Culture of Responsible Lab Conduct. Science, 322:1186

8. Plemmons DK, Kalichman MW (2013). Reported Goals of Instructors of Responsible Conduct of Research for Teaching of Skills. Journal of Empirical Research on Human Research Ethics : JERHRE, 8(2), 95–103. http://doi.org/10.1525/jer.2013.8.2.95

9. **Swazey JP, Anderson MS (1996): Mentors, advisors, and role models in graduate and professional education. Association of Academic Health Centers, Washington, DC.**

10. **Whitbeck C (2001): Group mentoring to foster the responsible conduct of research. Science and Engineering Ethics 7:541-558.**

11. Wright DE, Titus SL, Cornelison JB (2008): Mentoring and Research Misconduct: An Analysis of Research Mentoring in Closed ORI Cases. Science and Engineering Ethics 14(3): 323-336. http://www.springerlink.com/content/70w5wu2142w6151g/fulltext.html

Mentoring

1. Macrina FL (2014): Chapter 3. Mentoring. In: (Macrina FL, au.) Scientific Integrity. An Introductory Text with Cases. 4th Edition, ASM Press, Washington, D.C. http://www.scientificintegrity.net
2. **National Academy of Sciences, National Academy of Engineering, and Institute of Medicine (1997): Adviser, Teacher, Role Model, Friend: On Being a Mentor to Students in Science and Engineering. National Academy Press, Washington, D.C., 84 pp. http://www.nap.edu/catalog.php?record_id=5789**
3. National Institutes of Health: A Guide to Training and Mentoring in the Intramural Research Program at NIH. http://www1.od.nih.gov/oir/sourcebook/ethic-conduct/mentor-guide.htm
4. University of Michigan (2010): How to Get the Mentoring You Want: A Guide for Graduate Students, Rackham Graduate School. http://www.rackham.umich.edu/downloads/publications/mentoring.pdf
5. **University of Michigan (2011): How to Mentor Graduate Students: A Guide for Faculty. Rackham Graduate School. http://www.rackham.umich.edu/downloads/publications/Fmentoring.pdf**
6. University of Wisconsin: Resources for Each Phase of the Mentoring Relationship. https://mentoringresources.ictr.wisc.edu/MentoringResources

Readings for Students about Science and Ethics

1. Angier N, Thomas L (1999): Natural Obsessions: Striving to Unlock the Deepest Secrets of the Cancer Cell. Mariner Books.
2. Barker K (2002): At the Helm: A Laboratory Navigator. Cold Spring Harbor Laboratory Press.
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4. Beveridge WIB (1950): The Art of Scientific Investigation. Vintage Books, New York.
5. Bishop JM (2003): How to Win the Nobel Prize: An Unexpected Life in Science. Harvard University Press.
6. Feibelman PJ (1993): A Ph.D. is Not Enough: A Guide to Survival in Science. Addison-Wesley, Reading, MA.
7. Grinnell F (2008): The Everyday Practice of Science Oxford University Press.
8. Gunsalus CK (2012): The Young Professional's Survival Guide: From Cab Fares to Moral Snares. Harvard University Press.

9. Kanigel R (1993): Apprentice to Genius: The Making of a Scientific Dynasty. Johns Hopkins University Press.
10. **Kennedy D (1997): Academic Duty. Harvard University Press.**
11. Lang JM (2005): Life on the Tenure Track: Lessons from the First Year. Johns Hopkins University Press, Baltimore.
12. Medawar PB (1979): Advice to a Young Scientist. Harper & Row, Philadelphia.
13. Ramon y Cajal S (1999): Advice for a Young Investigator. MIT Press
14. Selye H (1964): From Dream to Discovery: On Being a Scientist. McGraw-Hill, New York.
15. Schoenfeld C (1992): Mentor in a manual: climbing the academic ladder to tenure. Magna Publications, Madison, WI.
16. Sindermann CJ (1987): Survival Strategies of New Scientists. Plenum Press, New York.
17. Skloot R (2010): The Immortal Life of Henrietta Lacks. Crown.
18. Slack JMW (1998): Egg and Ego: An Almost True Story of Life in the Biology Lab. Springer Press.
19. Sutton RI (2007): The No Asshole Rule: Building a Civilized Workplace and Surviving One That Isn't. Business Plus.

Other Approaches for Ethics in Context

The approaches discussed in this workshop are only selected examples that may be useful for you and your research environment. However there are many other approaches that might be worth considering. Some of these include the following:

1. Review of research plans or protocols:
   Depending on the nature of your research, it may be that existing documents outline methods, approaches, and/or plans for the conduct of your research. A careful review of those plans can be a useful exercise to identify ethical or values issues intrinsic to your research.
2. Guest speakers:
   Inviting others with appropriate expertise is an opportunity to gain helpful perspectives on topics that might be a good match for your area of research. Some possibilities might be a campus ombudsperson to talk about how to handle difficult questions, someone from internal audit services to discuss recordkeeping, or a representative from an office that has oversight responsibility for research with animal subjects, human subjects, or stem cells.
3. Illinois Two-Minute Challenge (2MC) Approach:
   Originally developed for teaching ethics and professional responsibility at the University of Illinois by C.K. Gunsalus, Director of the National Center for Professional and Research Ethics, two minute challenges are designed to present realistic dilemmas that arise concerning research ethics, along with a structured decision-making framework for assessing how to respond. Given the brief time commitment, this is a good option for use in the research environment. The National Center for Professional and Research Ethics (NCPRE) [http://ethicscenter.csl.illinois.edu] hosts a library of 2MCs that connect to other resources including teaching materials, bibliographies, videos, etc.

Research Ethics Workshop Evaluation **SAMPLE**

Your anonymous evaluation of this workshop will be invaluable for planning for future versions of this type of program.

Using a scale of 1 to 5 (1=very low, 5=very high), please rate the extent to which today's workshop helped you to meet the stated objectives for your particular research environment, which include being able to:

1. Articulate ***rationales*** for integrating research ethics education. ____
2. List and describe ethics ***topics*** suitable and useful to be addressed. ____
3. List and describe ***approaches*** for integrating research ethics education. ____
4. Design one or more ***activities*** to introduce research ethics. ____

5. Using a scale of 1 to 5 (1=very low, 5=very high), how would you score the overall value of this workshop? ____
6. How, if at all, have your perceptions or understanding been changed by participating in today's workshop?
7. How would you describe the value of this workshop to your plans for teaching or promoting research ethics?
8. What changes would you recommend to help improve future versions of this workshop?
9. Please use the space below or the back of this page if you have any additional comments or suggestions about future workshops on this topic: