PROFESSIONAL INTEGRITY: BEST PRACTICES FOR PUBLISHING YOUR RESEARCH

Authorship

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Collaborating Partners

American Physiological Society

Biomedical Engineering Society

Society for Biological Engineering

Authorship

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This module is part of a series of seven teaching modules designed to promote best practices in publication ethics for life scientists and biomedical engineers who publish research papers. All materials in this module have been peer-reviewed by both the Advisory Board (below) and a panel of Responsible Conduct of Research (RCR) course instructors. They also were field-tested with graduate students in physiology. The modules were developed with support from the National Science Foundation (NSF) (#SES -1238368) and in collaboration with staff and members of the American Physiological Society (APS), Biomedical Engineering Society (BMES), and Society for Biological Engineering (SBE). The modules represent the views of the authors and do not necessarily represent the views of NSF, APS, BMES, or SBE. The information in these modules is designed to represent a summary of best practices and advice at the time of publication. They are not meant to serve as legal advice or publisher policy and do not in any way guarantee protection from professional ethics charges. For more information on how the materials were developed and tested, please contact the authors: Marsha Lakes Matyas: education@the-aps.org; Christina N. Bennett: apsethics@the-aps.org, American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814, www.the-aps.org.

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Authorship Module

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I. Pedagogy

This module is designed to promote best practices in publication ethics for life scientists and biomedical engineers who publish research papers. The goal is for students to not only understand professional standards of practice in research manuscript development but also to be able to apply these standards to their own work AND to be prepared to teach them to their own students in the future. Toward that end, this module employs student-centered learning strategies that engage students across the spectrum of Bloom's taxonomy (see below). For best impact, students should not simply sit and listen or read and answer questions. Instead, we encourage you to use multiple teaching methods and activities that engage students in actively exploring the topic. Some suggestions you will find in this module include:

- **Interactive Lecture:** The lecture slides and notes include a number of places to stop and engage students in working out a problem, discussing a policy, or reviewing a case study.
- **Think/Pair/Share:** Often part of an Interactive Lecture, students are given a problem to address first on their own, and then they are asked to share their responses with a partner, followed by sharing with the whole class.
- **Voting Cards:** Particularly when discussing ethics issues, students prefer not to raise their hands to indicate their answer to a group question. Consider using voting cards with a simple large-print "Yes" on one side and "No" on the other. Everyone raises their hands and votes and you can quickly visualize the class response. An alternative is "thumbs up/thumbs down" but this is harder to see.
- **My Best Practice Checklists:** These are working documents each student develops to use now and in the future as their personal checklists of best practice in publication ethics.
- **PASS IT ON:** As part of their My Best Practice Checklists, students should make a plan for teaching publication ethics to their future trainees.

Instructors can pick and choose which activities and resources they want to use from the module. However, we encourage you to consider using the Learning Cycle approach because of its rich opportunities for student-centered learning. Alternatively, the Homework/Interactive Lecture/Activities (HILA) approach can be used when class time is limited. Both approaches are outlined below.

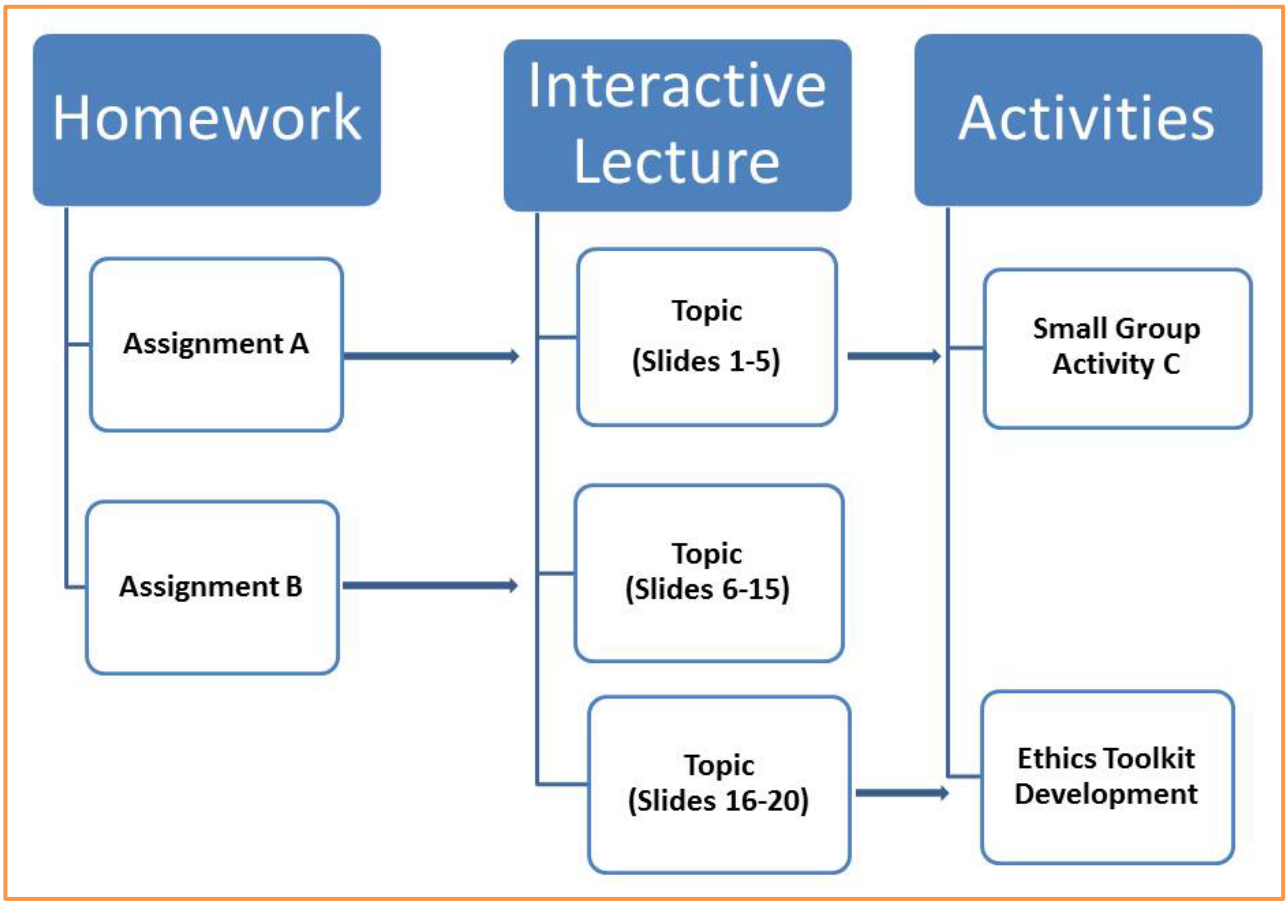
Learning Cycle

- **Engage**: Piques students' interest in the topic and poses questions or issues that capture their thinking. *Examples:* News articles on ethics violations and examples of manipulated figures.
- **Explore**: Students explore and ask questions, investigate via inquiry, make observations, and test hypotheses. Students should generate additional questions by the end of the exploration phase. *Examples:* Case study that students must try to resolve individually or in groups without additional information on professional standards of practice (these would be readdressed in the elaborate phase below), compare CV's of researchers, interpret letters from editors including comments/questions from reviewers, or write a letter to the editor describing figure manipulation in a manuscript to be submitted.

- **Explain**: Students and instructors use questioning/discussion, reference materials (print and online), expert presentations, and other resources to gain a better understanding of the key principles of the lesson and how they apply to the questions raised by students in the explore phase.
- **Elaborate**: Students apply what they have learned to real scenarios. *Examples:* Students revise their response to the explore phase case study using the principles and knowledge gained in the explain phase, and then do the same for a new case study or, ideally, their own work. Create a personal action plan or checklist for professional standards to use in the future.
- **Evaluate**: Evaluation occurs through each phase, with evidence collected of both student understanding of key principles and information and their ability to apply it to new situations and problems. *Examples:* Changes in approach to case study before and after the explain phase. Personal action plan/checklist addresses the key principles of professional practice. Key principles are applied appropriately to new case studies. Can also include quizzes or tests of content knowledge of professional standards of practice.

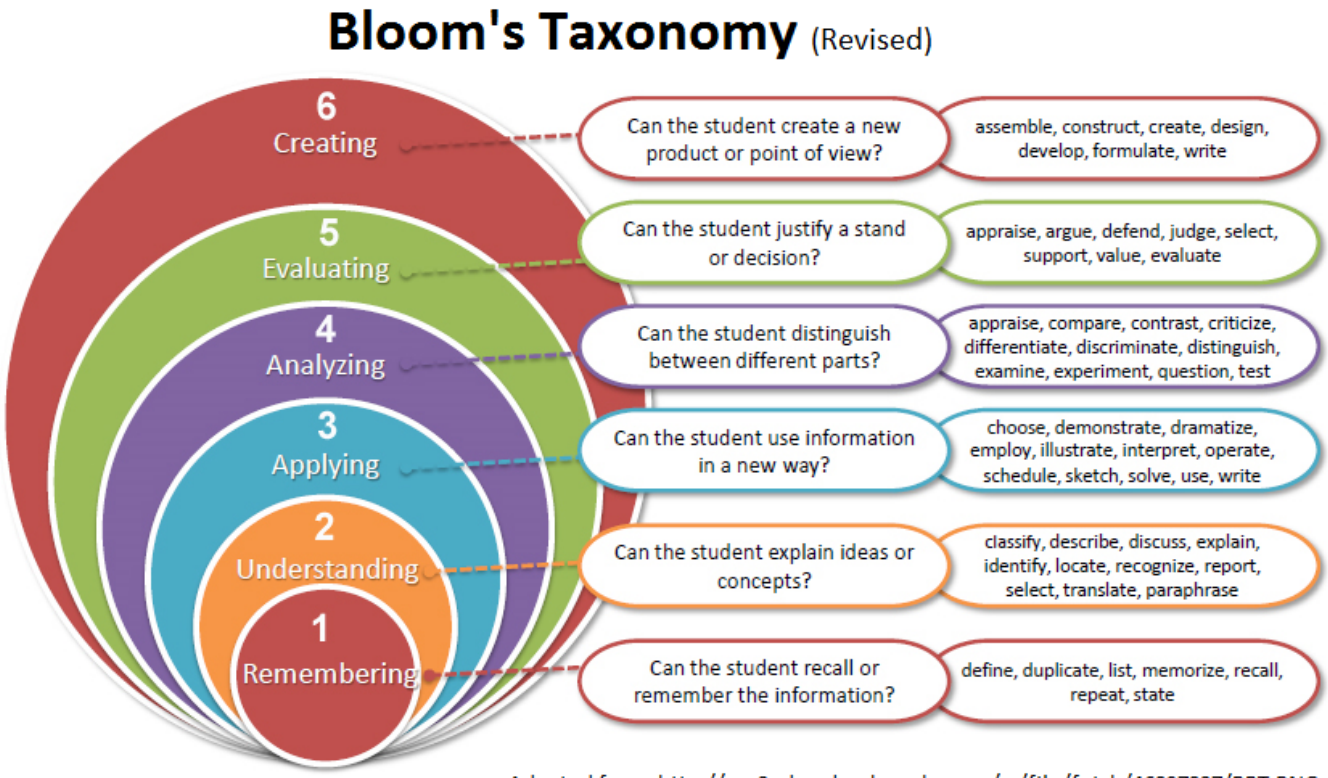
Homework/Interactive Lecture/Activities (HILA)

Homework activities are discussed either during the Interactive Lecture or during follow up activities.



Bloom's Taxonomy

Bloom's Taxonomy (established 1956, revised 2001) helps educators more effectively structure their teaching, student learning, and assessment of skills and knowledge. Organizing learning objectives by Blooms Taxonomy helps educators assure that lessons do not focus solely on memorizing basic knowledge but also challenge students to apply what they learn, evaluate new situations, and create solutions to challenging problems. Higher level objectives engage students in learning situations that are more complex and abstract. Overall, the professional ethics lessons in this series of seven modules focus strongly on the higher Bloom's levels (5 – Evaluating (20%) and 6 – Creating (21%)) in addition to including objectives for basic knowledge (Level 2 – Understanding (30%)) and application (Level 3 – Applying (14%)).



Adapted from: http://pcs2ndgrade.pbworks.com/w/file/fetch/46897827/RBT.PNG

Student Handouts

The student section of this guide is formatted for easy duplication. This guide is also available as an MS Word (.doc) file (See References). We encourage you to provide both printed and .doc formats to students. The lessons are designed to help students create a personalized guide for their future work; developing their notes and best practices plans in a .doc format will help students use as well as modify their plans in the future.

II. Module Objectives

Students will be able to:	Bloom's Levels
1. Explain the importance of authorship in the context of scientific career development.	5
2. List the professional standards for assigning authorship and describe common authorship scenarios.	1, 2
3. Apply the professional standards for assigning authorship to common scenarios to evaluate authorship claims.	5
4. Given a list of potential authors and their contributions to manuscript development, evaluate their appropriateness to be named an author and whether they should be listed as a first, last, or middle author on the paper.	5
5. Discuss the potential authors' perspectives regarding the value of authorship.	2
6. Discuss how mitigating factors such as personnel changes, departmental and lab policies, and corporate contributions can influence standard practices for assigning authorship.	2
7. Construct and justify options for establishing authorship at the beginning and revising authorship at different stages of a project (proactive negotiations).	5, 6
8. Develop and revise a strategy or set of steps for preventing and resolving authorship disputes.	6

III. Instructor Guide

Target Audience
This module can be used with both graduate students and undergraduate students. It was initially designed for early career graduate students in biological science, medical science, or biological engineering graduate programs. Graduate students are likely to be somewhat aware of the academic publishing process but may not have had first-hand experience. Undergraduate students engaged in research and scientific writing may also find the materials useful.

Instructor Tips

1) Select the objectives and related activities that you want to address. Edit the PowerPoint Presentation to include the activities and objectives selected.
2) The script/key points for the presentation are in the notes section of the PowerPoint slides.
3) We encourage you to share 1-2 minute personal stories, when appropriate. Keep the stories positive (i.e., "I had a dilemma and I utilized a best practice…dilemma resolved").
4) Allow students to reach conclusions on their own. You are their guide through this class. Facilitate discussion to keep them on task and within time limits.
5) **Be sure to include the "My Checklist" activity in each unit. This is the major "take away" lesson through which students integrate what they have learned in order to develop: 1) their personal checklists for ethical writing; and 2) their plans for teaching publication ethics best practices to their future trainees.**

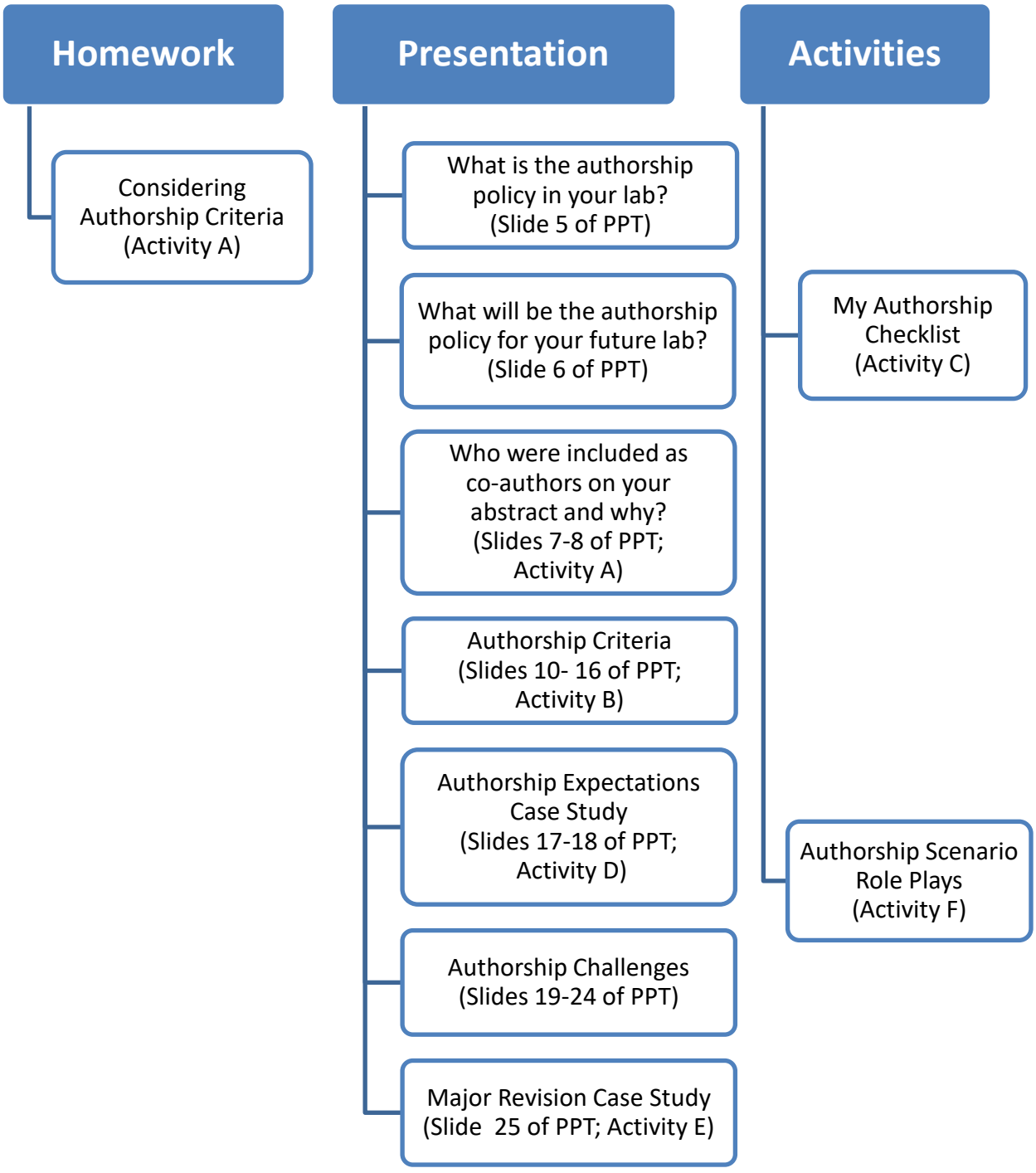
Teaching Approaches
Learning Cycle and Homework/Interactive Lecture/Activities (HILA) approaches are outlined below.

Evaluation Rubrics and Test Questions
Evaluation rubrics for assignments and test questions are available on request from the authors (email: education@the-aps.org).

Authorship
Learning Cycle

Engage	• In **Activity D**: Authorship Expectations Case Study, read the first case example and answer the first two questions.
Explore	• Complete **Activity A**: Considering Authorship Criteria. • Complete **Activity B**: Worksheet for Authorship Criteria.
Explain	• Present **Interactive Lecture**.
Elaborate	• Complete **Activity D**: Authorship Expectations Case Studies and review in class. • Complete **Activity E**: Major Revisions (Case Studies) and review in class. • Complete **Activity F**: Authorship Scenarios to Consider (Role Playing).
Evaluate	• Complete **Activity C**: My Authorship Checklist and review with instructor. • Quiz/test questions and answer keys are available from the authors.

Authorship
Homework/Interactive Lecture/Activities



Activity A
Considering Authorship Criteria

Purpose

This activity will allow students to identify and compare authorship policies in journals and their own laboratories, to practice applying those criteria to their own work, and to begin generating personal authorship criteria and procedures. After completing this activity, students will be able to describe and apply at least one set of professional standards to assigning authorship for their work.

Objectives

2. List the professional standards for assigning authorship and describe common authorship scenarios.
3. Apply the professional standards for assigning authorship to common scenarios to evaluate authorship claims.
4. Given a list of potential authors and their contributions to manuscript development, evaluate their appropriateness to be named an author and whether they should be listed as a first, last, or middle author on the paper.

Procedure

Learning Cycle: Students complete the Activity A worksheet as an Explore activity. The instructor should discuss their responses in class. Remember that ICMJE criteria will be discussed in the next activity, so all questions do not have to be resolved.

HILA: Students complete the Activity A worksheet (Parts 1, 2, and 4) before coming to class and review and complete the remainder of the worksheet during the Interactive Lecture. Remember that ICMJE criteria will be discussed in the next activity so all questions do not have to be resolved.

NOTE: When discussing the authorship policy in the students' laboratories, be careful to not challenge those policies directly. When discussing students' ideas about their own future policy for authorship, do not correct misconceptions at this point in time. Encourage students to think of these as a first draft of their policy. They will revise their policy later in the unit.

REMINDER: ***Encourage students to note ideas they want to add to their My Authorship Checklist*.**

Activity B
Worksheet for Authorship Criteria

Purpose

This activity will allow students to apply standard criteria for authorship to their own collaborations and projects. After completing this activity, students will be able to determine who should be listed as an author on their papers and justify those choices using standard criteria.

Objectives

2. List the professional standards for assigning authorship and describe common authorship scenarios.
3. Apply the professional standards for assigning authorship to common scenarios to evaluate authorship claims.
4. Given a list of potential authors and their contributions to manuscript development, evaluate their appropriateness to be named an author and whether they should be listed as a first, last, or middle author on the paper.
5. Discuss the potential authors' perspectives regarding the value of authorship.

Procedure

Learning Cycle: Activity B should be done in the Explore phase and can be done as homework or in class.
HILA: Activity B should be done during the Interactive Lecture. Can be done as homework before or after the lecture, if preferred.

Ask each student to bring a recent abstract on which s/he was an author. Students already used this abstract in Activity A to list the authors and their contributions. Ask students to imagine that the abstract and research is now being translated into a journal manuscript. Students should use the worksheet in Activity B to determine who should and should not be an author on the manuscript. Encourage students to read the brief excerpt from the ICMJE guidelines at the end of Activity B and use the ICMJE guidelines in making their decisions.

REMINDER: ***Encourage students to note ideas they want to add to their My Authorship Checklist.***

Activity C
My Authorship Checklist

Purpose

Students will develop a checklist based on course material that they can use now and in the future to guide ethical assignment of authorship. They should use materials from the activities, readings, and Interactive Lecture. After completing the activity, students should have a checklist for authorship AND a plan for teaching these best practices to their students.

Objectives

1. Explain the importance of authorship in the context of scientific career development.
2. List the professional standards for assigning authorship and describe common authorship scenarios.
3. Apply the professional standards for assigning authorship to common scenarios to evaluate authorship claims.
4. Given a list of potential authors and their contributions to manuscript development, evaluate their appropriateness to be named an author and whether they should be listed as a first, last, or middle author on the paper.
5. Discuss the potential authors' perspectives regarding the value of authorship.
6. Discuss how mitigating factors such as personnel changes, departmental and lab policies, and corporate contributions can influence standard practices for assigning authorship.
7. Construct and justify options for establishing authorship at the beginning and revising authorship at different stages of a project (proactive negotiations).
8. Develop and revise a strategy or set of steps for preventing and resolving authorship disputes.

Procedure

Learning Cycle: Complete in the Evaluate phase. Students should do this individually but will want to share their lists in class or with the instructor.
HILA: Should be done after the Interactive Lecture. Students should do this individually but will want to share their lists in class or with the instructor.

NOTE: Review student work to assure that their authorship policies meet ethical standards and match ICJME and journal criteria. Help students understand that authorships are not given as rewards but are earned by specific and substantial contributions to a study and manuscript. Be prepared to discuss conflicts of interest such as corporate sponsorships.

Encourage students to include:

1. The ICMJE criteria for authorship and link to the ICMJE website.
2. Distinctions for assigning acknowledgement versus authorship.
3. Definitions of guest author and ghost author.
4. The steps for determining authorship (presented in the Interactive Lecture).
5. The general distinctions for assigning first, last, and middle authorships.
6. A general plan for continuing projects after leaving the lab (graduation, etc.).

Activity D
Authorship Expectations Case Study

Purpose This activity helps students learn to apply authorship criteria in real life scenarios. After completing this activity, students will be able to determine who should be listed as an author on their papers and justify those choices using standard criteria.

Objectives

1. Explain the importance of authorship in the context of scientific career development.
2. List the professional standards for assigning authorship and describe common authorship scenarios.
3. Apply the professional standards for assigning authorship to common scenarios to evaluate authorship claims.
4. Given a list of potential authors and their contributions to manuscript development, evaluate their appropriateness to be named an author and whether they should be listed as a first, last, or middle author on the paper.
5. Discuss the potential authors' perspectives regarding the value of authorship.
7. Construct and justify options for establishing authorship at the beginning and revising authorship at different stages of a project (proactive negotiations).
8. Develop and revise a strategy or set of steps for preventing and resolving authorship disputes.

Procedure **Learning Cycle:** Activity D should be done as part of the Elaborate phase. It can be done in class or as homework and reviewed in class.
HILA: Activity D should be done as part of the Interactive Lecture activities.

Answers for the Instructor are provided in *italics*.

Case Study: Why not me?

Dr. Mac started her lab 4 years ago. Her lab is active and growing. Right now, there are three graduate students in the lab (Sarah, 4th yr.; Raj, 3rd yr.; and Jess, 1st yr.), as well as a research technician, Norman, and two part-time undergraduate students, April and Becky. Dr. Mac encourages everyone to work together on their projects with the theory that if one does well, everyone benefits.

Raj's research project is going well. He has started to prepare the results for publication and has almost finished the first draft of his manuscript. Dr. Mac asks him to present the outline of his manuscript at the next lab meeting to discuss how best to complete the manuscript for publication.
At the next lab meeting, Raj presents to the group the title "Sugar water increases body mass of Wnt10b mice" and "Raj Nice and Henrietta Mac" as the authors of his draft manuscript. Several

lab members provide immediate feedback.

Sarah: "Why am I not on the authorship list? I taught you everything you know! And the cell culture data in the paper were done by me, not you. I NEED to be an author on this paper!"

Jess: "Yeah, I mean I fed the mice the sugar water every day for 6 months. You said that if I helped you, I would be an author."

Sarah: "And what about Norman? He did all of the assays. You just analyzed the results."

Norman: "The assays were routine work. Raj, I'm glad your study went so well."

April: "I didn't necessarily think that I would be an author, but I did help you every afternoon for the past year and a half. I even did parallel studies to rule out some of your experimental candidates. Does that qualify for authorship?"

1. **Should Raj revise his authorship list? Why or why not?**
   - *Raj should reconsider his authorship list. He could use a worksheet to consider who participated in the project and whether the participation of each is significant enough for inclusion as an author.*

2. **If so, what do you suggest and why? (USE the worksheet)**
   - *It sounds like Sarah provided some of the data and April may have played a significant role. Not certain about Jess or Norman. Did they provide any intellectual input? They may be better placed in the Acknowledgments section.*

3. **How could Raj have avoided this tense situation?**
   - *He could have discussed authorship expectations with Dr. Mac and potential co-authors earlier in the project. Dr. Mac may have a set authorship policy for the lab that could have provided guidance. He also could have provided an explanation for his authorship choice. Using a checklist for determining authorship would have been helpful to facilitate discussion.*

REMINDER: ***Encourage students to note ideas they want to add to their My Authorship Checklist.***

Activity E
Major Revision Case Study

Purpose

This group activity will allow participants to consider how changes in circumstances may affect the authorship list of a manuscript. After completing this activity, students will be able to adapt an authorship plan as the participants in the work change over time. The participants will be able to identify the stakeholders' perspectives and recognize the value of authorship to each (PI, student, postdoc, technician, etc.).

Objectives

2. List the professional standards for assigning authorship and describe common authorship scenarios.
3. Apply the professional standards for assigning authorship to common scenarios to evaluate authorship claims.
4. Given a list of potential authors and their contributions to manuscript development, evaluate their appropriateness to be named an author and whether they should be listed as a first, last, or middle author on the paper.
6. Discuss how mitigating factors such as personnel changes, departmental and lab policies, and corporate contributions can influence standard practices for assigning authorship.
7. Construct and justify options for establishing authorship at the beginning and revising authorship at different stages of a project (proactive negotiations).
8. Develop and revise a strategy or set of steps for preventing and resolving authorship disputes.

Procedure

Learning Cycle: Complete in the Elaborate phase. Students can do this individually but will want to discuss their answers with the group.
HILA: Should be done during the Interactive Lecture.

Have one participant, or the instructor, read the scenario out loud to the class. Encourage participants to refer to their notes from the original case study (Activity D) on the Raj and Dr. Mac manuscript and revise them in response to the changes in personnel. Raise the questions listed below with the class. For questions that appear to require more than one decision, expand and facilitate discussion. Also, be sure to discuss motives and perspectives on authorship for each contributor.

Answers for the Instructor are provided in *italics*.

Case Study: Major Revision

Raj submits his paper entitled "Sugar water increases body mass of Wnt10b mice" by "Raj Nice, Sarah Roswell, April Smith, and Henrietta Mac" to *AJP-Endocrinology and Metabolism*. The reviews come back: "MAJOR REVISION." The reviewers note that he needs to do more mouse and cell culture experiments to rule out some alternative interpretations of the data.

Raj had not planned to do any more work on this paper. In fact, he is scheduled to defend his thesis in just 2 weeks and start a postdoc in 4 weeks. Dr. Mac suggests that he ask Jess to perform the experiments that the reviewers have suggested. Raj agrees with Dr. Mac, and he asks Jess to finish up the paper. Dr. Mac even promises to add Jess as an author.

Six months later, Dr. Mac meets with Jess to discuss the revised paper. Dr. Mac notices that Jess's name is now listed as second author and asks her to explain the order.

Jess replies: "I have been working on these revisions all day for 6 months. Raj and Sarah have both left the lab and have not been much help besides reviewing the revised manuscript. I performed the requested experiments, revised the manuscript, and even re-did some of Raj's experiments to confirm the results with the new reagents. I deserve to be second author, possibly even first author considering that the paper would not be published without my effort."

1. **Do you agree with Jess? Why or why not?**
   - *(This is just one opinion.) There is definitely an argument to be made that she deserves to be added as an author. Not certain that she should be first or second author, since her intellectual contribution may not have been as significant as those who originally designed the experiments. On the other hand, without her technical and intellectual effort to complete the revisions, the manuscript might have remained incomplete and unpublished.*

2. **Should Raj remain as first author? Why or why not?**
   - *Likely so; without his initial effort, there would be no manuscript to revise. This is especially true if Raj continued to participate in the revision process.*

3. **Should Jess be included as an author at all? Why or why not?**
   - *Some might say that she acted more like a technician and that the intellectual contribution came from the reviewers. Those with this opinion might suggest that Jess should be thanked in the Acknowledgments section. However, many would see her intellectual and technical contributions as being significant and essential for getting the paper published.*

4. **What should Dr. Mac do to determine how best to revise the authorship list?**
   - *It would be a good idea for the authors to meet and go through the entire revised paper to assess each author's contribution. If Jess contributed a significant amount of new data, there should be some serious discussion about revising the authorship order.*

5. **What should be the final authorship list and in what order? Should anyone be acknowledged?**
   - *Jess may deserve to be second or third author. It depends on how much Sarah contributed compared to Jess and how significant those contributions were to the intellectual impact of the paper. The rest of the authors should remain the same.*

6. **What should Dr. Mac do to avoid these situations in her lab in the future?**
   - *Dr. Mac should have discussed authorship order with Jess when she first offered authorship to Jess. Even if the initial discussion was general, Jess should understand how her contributions could affect authorship order. Then, as Jess's expected contribution changed, Dr. Mac could have discussed changes to authorship order with all of the authors.*

REMINDER: ***Encourage students to note ideas they want to add to their My Authorship Checklist.***

Activity F
Authorship Scenario Role Plays

Purpose

This group activity will allow participants to practice how they would respond in common authorship situations. After completing this activity, students will be able to make choices about how to handle common authorship situations and justify those choices using standard criteria.

Objectives

2. List the professional standards for assigning authorship and describe common authorship scenarios.
3. Apply the professional standards for assigning authorship to common scenarios to evaluate authorship claims.
4. Given a list of potential authors and their contributions to manuscript development, evaluate their appropriateness to be named an author and whether they should be listed as a first, last, or middle author on the paper.
7. Construct and justify options for establishing authorship at the beginning and revising authorship at different stages of a project (proactive negotiations).
8. Develop and revise a strategy or set of steps for preventing and resolving authorship disputes.

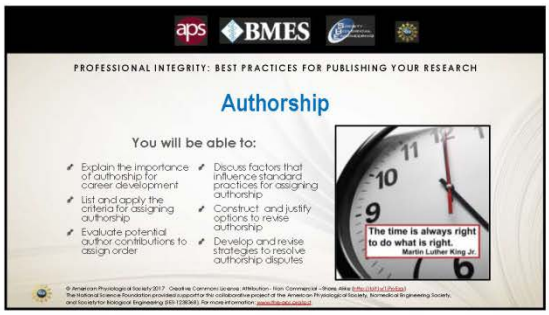
Procedure

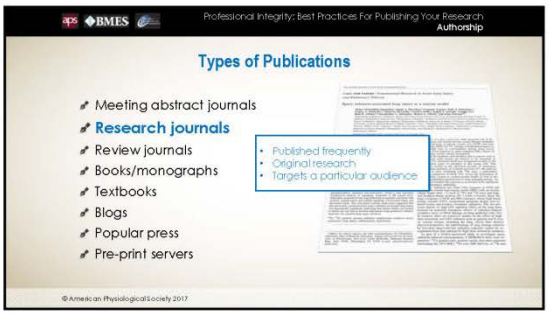
Learning Cycle: Complete in the Elaborate phase. Students should do this in groups.
HILA: Should be done after the Interactive Lecture.

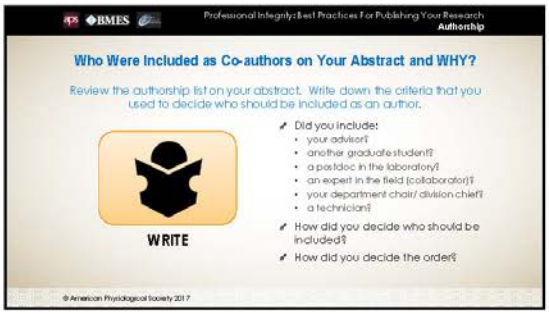
In groups, students should decide who will play the roles and present their scenario to the rest of the class. Then they should identify the problem and decide how to address the matter. Note the discussion questions for each scenario.

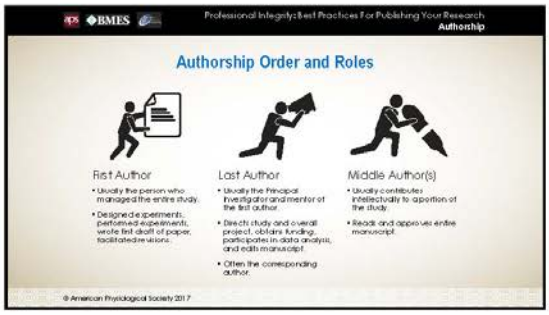
NOTE: There is likely more than one way to address the problem. Students should consider presenting the case as if it were a movie/TV show and present several alternative endings. Role playing is a great way for students to practice how they would handle a situation, whether it is an authorship issue or other work scenarios.

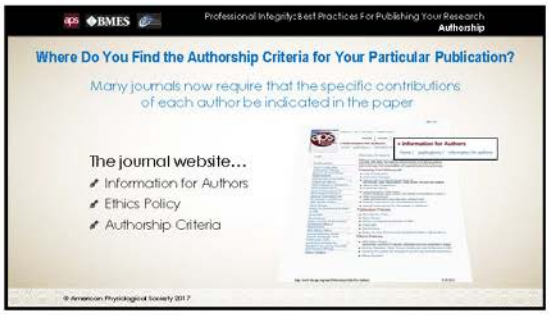
Presentation Slides

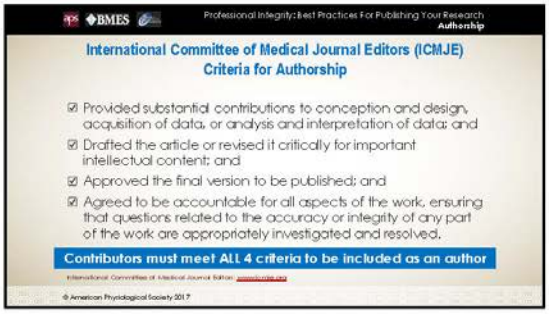


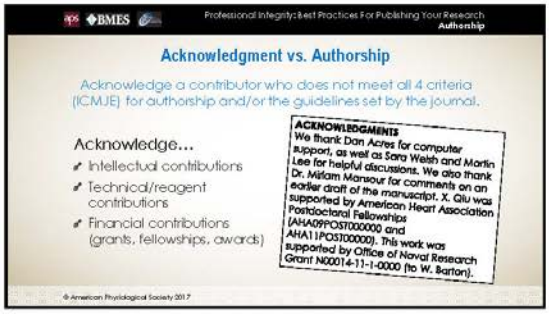


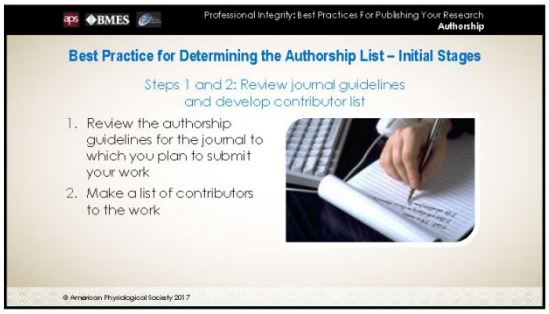











Professional Integrity: Best Practices For Publishing Your Research
Authorship
Best Practice for Determining the Authorship List – Initial Stages
Steps 1 and 2: Review journal guidelines and develop contributor list
1. Review the authorship guidelines for the journal to which you plan to submit your work
2. Make a list of contributors to the work
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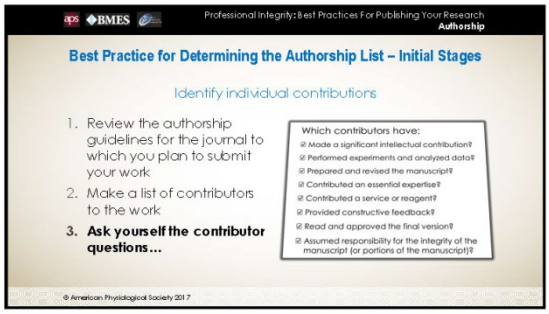
Professional Integrity: Best Practices For Publishing Your Research
Authorship
Best Practice for Determining the Authorship List – Initial Stages
Identify individual contributions
1. Review the authorship guidelines for the journal to which you plan to submit your work
2. Make a list of contributors to the work
3. Ask yourself the contributor questions…
Which contributors have:
Made a significant intellectual contribution?
Performed experiments and analyzed data?
Prepared and revised the manuscript?
Contributed an essential expertise?
Contributed a service or reagent?
Provided constructive feedback?
Read and approved the final version?
Assumed responsibility for the integrity of the manuscript (or portions of the manuscript)?
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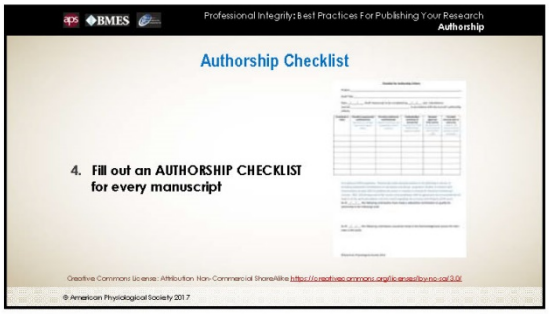
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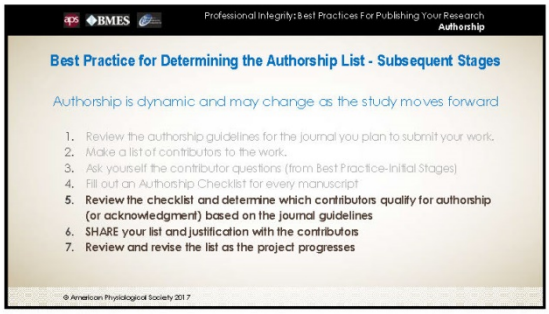
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Authorship is dynamic and may change as the study moves forward
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Professional Integrity: Best Practices For Publishing Your Research
Authorship
Authorship Expectations
Read the scenario and consider who qualifies for authorship and why.
How does each contributor value authorship?
Do their expectations agree with your authorship guidelines?
READ AND WRITE
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Professional Integrity: Best Practices For Publishing Your Research
Authorship
"Authorship Expectations"
Which Contributors Qualify for Authorship?
Based upon the previous scenario, which contributors qualify for authorship?
Use voting cards or raise your hands to give your personal perspectives.
Yes
No
DISCUSS
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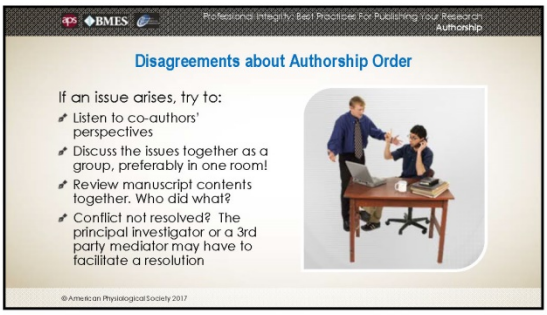

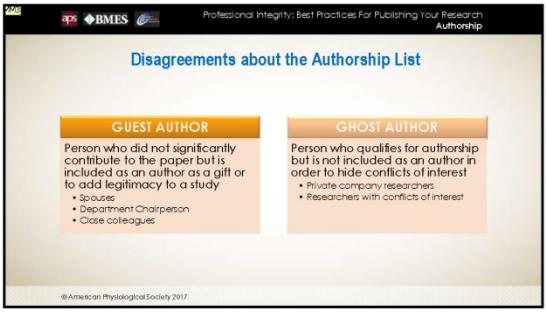

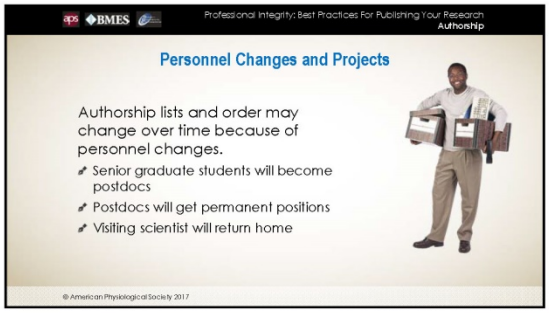

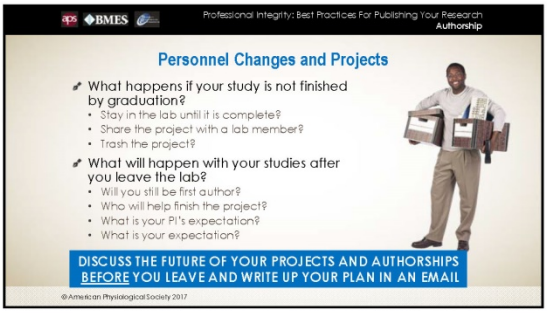

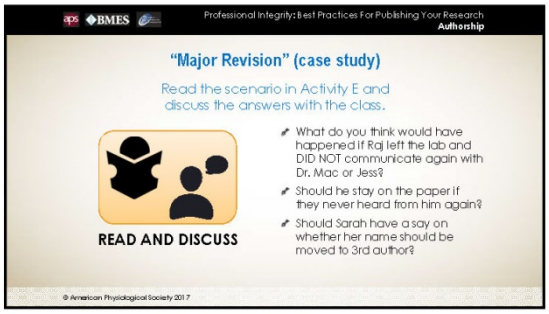
Professional Integrity: Best Practices For Publishing Your Research
Authorship
"Major Revision" (case study)
Read the scenario in Activity E and discuss the answers with the class.
READ AND DISCUSS
What do you think would have happened if Raj left the lab and DID NOT communicate again with Dr. Mac or Jess?
Should he stay on the paper if they never heard from him again?
Should Sarah have a say on whether her name should be moved to 3rd author?
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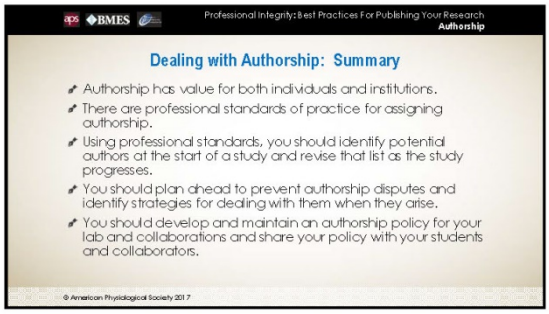
Professional Integrity: Best Practices For Publishing Your Research
Authorship
Dealing with Authorship: Summary
Authorship has value for both individuals and institutions.
There are professional standards of practice for assigning authorship.
Using professional standards, you should identify potential authors at the start of a study and revise that list as the study progresses.
You should plan ahead to prevent authorship disputes and identify strategies for dealing with them when they arise.
You should develop and maintain an authorship policy for your lab and collaborations and share your policy with your students and collaborators.
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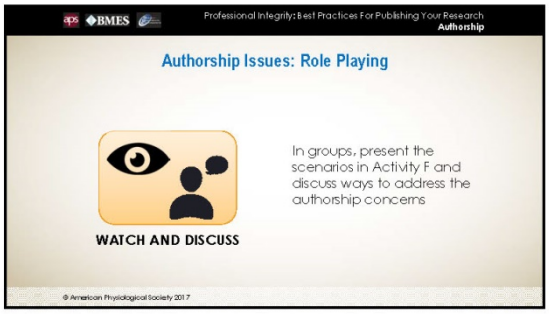
Professional Integrity: Best Practices For Publishing Your Research
Authorship
Authorship Issues: Role Playing
WATCH AND DISCUSS
In groups, present the scenarios in Activity F and discuss ways to address the authorship concerns
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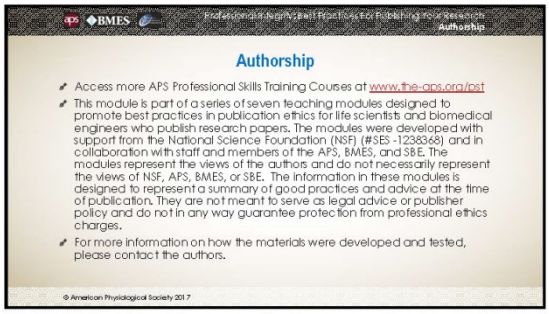
Professional Integrity: Best Practices For Publishing Your Research
Authorship
Authorship
Access more APS Professional Skills Training Courses at www.the-aps.org/pst
This module is part of a series of seven teaching modules designed to promote best practices in publication ethics for life scientists and biomedical engineers who publish research papers. The modules were developed with support from the National Science Foundation (NSF) (#SES -1238368) and in collaboration with staff and members of the APS, BMES, and SBE. The modules represent the views of the authors and do not necessarily represent the views of NSF, APS, BMES, or SBE. The information in these modules is designed to represent a summary of good practices and advice at the time of publication. They are not meant to serve as legal advice or publisher policy and do not in any way guarantee protection from professional ethics charges.
For more information on how the materials were developed and tested, please contact the authors.
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Presentation Slide Text

Slide #	Text
1	This presentation is part of the professional skills training series on professional integrity best practices for publishing your research. Today we will review best practices for assigning authorship in research publications. This presentation will help you to: • **Explain** the importance of authorship for career development • **List and apply** the criteria for assigning authorship • **Evaluate** potential author contributions to assign order. • **Discuss** factors that influence standard practices for assigning authorship • **Construct and justify** options to revise authorship AND • **Develop and revise** strategies to resolve authorship disputes
2	You have the opportunity to publish your research in many places. Usually, preliminary ideas (that is, studies that are almost complete) are presented at meetings and published as a meeting abstract in a professional society or organization-owned journal. Research articles (that is, those that describe new research findings) are published in research journals. And review articles that summarize a field of research are published in both journals AND books. Books are also used to share techniques, history, and topic-specific information; textbooks and research handbooks are good examples. Research also can be shared through blogs and popular press venues such as magazines or newspapers. More recently, authors have used preprint servers to provide access to their published and unpublished manuscripts. However, most researchers share their new findings in research journals. Why? Journals are published frequently and target particular audiences with both interest and expertise in the field. An important benefit of research journals is that the submitted manuscripts are peer-reviewed by experts in the field (that is, your colleagues and your competitors).
3	EVERY professional field has a “currency” or “product” by which the professionals in that field are measured or evaluated. In law, it may be cases won or dollars won in settlements. In business, it is profit. In many research fields, the currency of the profession is research publications. In research-intensive departments, scientists who do not produce publications often do not receive continuing contracts and/or offers of tenure.

	Thus, in many academic fields, much emphasis is placed on publishing your research. But WHY is publishing so important? Until your research becomes a tangible product, that is, a publication, few outside of your laboratory will ever know what you have accomplished and learned. You may have heard the saying, "**No paper, never happened."** Until the paper is published, a researcher's contribution is not completed, shared with the community, or contributing to the scientific knowledge base of the field. Moreover, publications are indicators of your research progress. It may be a requirement for your PhD, and it will be a good indicator for funding agencies and future employers to discern whether you will be a productive investigator. In this case, "**No publication, no progress"** means that your career progression is tied to publishing your research. But it is not JUST about publishing your results. Publishing allows YOU to receive credit for your hard work. You don't just want your work published. You want it to say: "This work was done by me." You also want other researchers who build on your work to cite it…again, attributing those discoveries to you. For these reasons, authorship of research journal articles is vital for success and, therefore, is an important issue for anyone who is a research scientist.
4	Authorship is the means by which your employers**,** fellow colleagues, competitors, family members, thesis committee members, and funding sources know that YOU performed the work, that the work was of publishable quality, and that YOU were successful in getting your studies published. It is also the means by which your institution, your collaborators and their institutions, and your research funders are recognized for their roles in the work. Of course, the studies performed in biological sciences are typically not completed by just one person. Usually, it requires contributions from a number of expert colleagues and support staff. Any one study can involve a lot of people, especially when you consider that your work may take a number of years. Your name equals your academic reputation. As an author, you should be able to verbally share the results and interpretations of the study. You are the voice of the paper. Authors also take responsibility for the work…that it is honest, thoughtfully interpreted, and, to the best of the author's knowledge, correct. Determining WHO should be an author on a particular manuscript often is a complicated process. As a future research team leader, you will need to determine authorship on many manuscripts. How will you establish and implement a fair policy that matches professional standards of practice in your field? In the following slides,

	we will spend some time exploring this issue.
5	As a homework assignment in Activity A: Part 1, you were tasked with asking your lab advisor about the authorship policy in the lab. - Does your advisor have a written policy? - Were you aware of the policy before you asked? - Was this information given to you when you signed on to rotate through the lab? Or when you signed on to join the lab? Principal investigators who have a lab policy on authorship AND share it with their students and collaborators can better facilitate authorship discussions because all authors will know the expectations that must be met to qualify for authorship. If your advisor does not have a lab policy on authorship, suggest that the entire lab work together to develop one.
6	As a homework assignment in Activity A: Part 2, you were tasked with drafting an authorship policy for your FUTURE lab. - What criteria will you use to determine the contributions that equate to authorship? - How will you handle changes to authorship as your projects progress? Hold onto your draft policy and feel free to make revisions as you go through this module.
7	In Activity A: Part 3, we asked you to identify one of your first-authored abstracts, write down the authors on the abstract and note the reasons why you consider them to be co-authors. If you have not done this exercise, please stop the recording and do it now. [3 second pause] Let's review your answers. Does your author list include your advisor? Another grad student? A postdoc in your lab? An expert or collaborator in the field? Your department chair or division chief? A technician? Are there other people listed as authors that are not noted above? How did you (or your advisor) decide who should be included as author? • What criteria were used to reach the decision that those listed should be authors?

	• Based on what you have learned so far about authorship, would you revise that list if you were writing this abstract now? • What about the order of the list? Are all authors equal? • What do you think the order of authorship means? Take a moment to write down ONE criterion you would use to determine the ORDER of authorship (that is, who is first author, second author, last author, etc.).
8	In many research disciplines authorship order is related to the amount each author contributed to the manuscript. The first author is usually the person who has managed the entire study. First authors frequently are graduate students or postdocs. Usually this person is the one who designed and performed the experiments, wrote and edited drafts of the paper, and facilitated collaborations. This person had the STRONGEST INTEREST in completing the study. The last author is usually the principal investigator of the project and mentor of the first author. They often direct the project, obtain the funding and participate in data analyses, discussions, and manuscript writing. They often suggest where to send the study for publication. Also, the last author is often the corresponding author, that is, the person who officially sends the manuscript to the journal. It is important that the corresponding author be someone whose academic address is not likely to change any time soon. Graduate students and postdocs move frequently; they are not typically the corresponding author for this reason. Middle authors are usually those who contributed to a portion of the study. Depending on your study, you may have no middle authors or you could have 20 or more. Usually, the closer your name is to the first author, such as second author, or to the last author, such as the second to last author, defines your contribution. That is, the second author is the second most important contributor to the work. It is important to note that authorship order and roles vary by field AND by lab. Thus, collaborators on interdisciplinary projects might use different ordering schemes. You will have to work together with your collaborators to identify a mutually agreeable authorship order.
9	You now have asked about the authorship guidelines in your lab and you drafted an authorship policy for your future lab. You also looked at how authorship was assigned on one of your abstracts. But aren't there clear guidelines somewhere for assigning authorship? Aren't there professional standards of practice for authorship? The answer is both "yes" and "no."

	First, let's see what guidelines are available to researchers.
10	One source for authorship criteria is the journals that publish your research. The criteria for authorship are not exactly the same for all journals. Thus, it is important to review the guidelines for the journal where you plan to submit your work. Many journal websites share this information via the "information for authors" or "ethics policy" pages. Some journals list their authorship expectations on their submission forms. Other journals email the authors listed on the manuscript at the time of submission. This serves to ensure that all authors are aware of and agree to the submission. Many journals also now require authors to declare their specific contributions to the preparation of the study and manuscript. These details are published with the manuscript and are useful in that they provide the reader a better sense of how each author contributed to the work. These are details that are not transparent in an author list.
11	An important source of authorship guidelines for anyone who publishes in medical or related journals are the International Committee of Medical Journal Editors (ICMJE) criteria for authorship. The ICMJE has defined what they consider to be appropriate criteria for authorship. The ICMJE guidelines are valuable because they provide good support for helping you make authorship decisions based on tangible criteria rather than subjective criteria including emotions, collegiality, or influence. The ICMJE guidelines are included in your course handouts but are also available online. There currently are four criteria for authorship. A contributor must have: • Provided substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; • Drafted the article or revised it critically for important intellectual content • Approved the final version to be published AND • Agreed to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Note that ALL 4 criteria must be met in order for a person to be an author on a paper. Someone who, for example, collected some of the data and proofread the final draft would not meet all of the criteria and should not be listed as an author according to these guidelines.

	This is a good time to mention that standards and best practices do change over time. That is why it is ALWAYS good practice to review the information for authors of a journal before writing a new manuscript because the guidelines may have changed since the last time you submitted a manuscript for review.
12	What about authorship versus acknowledgement? Those persons who do not meet the criteria for authorship could be included in the Acknowledgments section of the manuscript. Often, core facilities or those who provided routine technical support (performed routine assays) are thanked in the Acknowledgments section as well as are those who contributed to the progression of the work through "helpful discussions" or provided special reagents (such as cells, mice, DNA, or data sets). Financial support is also listed in the acknowledgments section including research grants, research awards, fellowships, and training grants. Here is an example of an Acknowledgements section in a manuscript that thanks the colleagues who assisted in the study but did not meet all the criteria of authorship. The Acknowledgements also notes the grants and fellowships that provided financial support for the work.
13	Deciding who should, or should not, be an author is not always easy to determine. Authorship is also personal. No one wants to feel like they put a lot of effort into a project and did not receive credit. It is important to recognize that each contributor may have a different perspective when it comes to authorship. Thus it is important to plan your authorship list early and revise as needed and before personal feelings get in the way. The following best practices will help you determine your authorship list. First, review the authorship guidelines for the journal to which you plan to submit your work. If a target journal has not been selected, the ICMJE guidelines can provide a good start. Second, make a list of contributors to the work. At this point, be inclusive. Write down everyone who contributed.
14	Third, ask yourself the following questions: Which contributors have: - Made a significant intellectual contribution? - Performed experiments and analyzed data? - Prepared and revised the manuscript? - Contributed an essential expertise?

	- Contributed a service or reagent? - Provided constructive feedback? - Read and approved the final version? - Assumed responsibility for the integrity of the manuscript (or portions of the manuscript)? Return to the author list you brought with you. Based on this checklist and the ICMJE guidelines, would you change anyone's status? Why?
15	To help keep this information straight, we have provided an authorship checklist in your course handouts. Stop the presentation and look at Activity B: Checklist for Authorship Criteria. Complete this checklist for the work described in your first-author abstract. Stop the presentation and do the activity now. [pause for 3 seconds] This checklist allows you to review the contributions of each author according to the ICMJE criteria. Did your checklist results agree with the authorships assigned on your abstract? It is a good exercise to fill out one of these checklists for each study you are working on. Post it somewhere visible at your desk and review it periodically. Using this checklist will allow you to assess which contributors qualify for authorship (or acknowledgment) based on the journal and likely the ICMJE guidelines.
16	Once you fill out the form, you may think you are done with the process of determining authorship. That is not always the case. Authorship is dynamic and may change as a study moves forward. Authorship should not be a surprise to anyone involved in a study. It is important to share the authorship checklist with your co-authors early in the study, even before you start the series of experiments. Collaboration requires open and ongoing communication about who is doing which part of the work and who will be meeting all the criteria for authorship. You will need to review your authorship list regularly and will probably revise your authorship list periodically. This is not meant to encourage you to completely change the authorship list every few months! This should be a constructive activity, designed to assure appropriate credit for all collaborators. <u>Authorship should NEVER be given as a reward or removed as a punishment</u>. Now you have professional standards of practice to help guide your authorship decisions.

	Remember that it is important to apply these guidelines whenever you are asked to be an author on a manuscript as well as deciding authorships on your own manuscripts. If the lead researcher on a study does not bring up authorship and division of work with you, you should bring it up for discussion at the start of the collaboration.
17	At this time, pause the presentation and apply your authorship assignment skills by completing Activity D: Authorship Expectations Case Study. Read the scenario and work individually or in groups to answer the questions. Be sure to use an authorship checklist.
18	In this scenario, Raj could have avoided some frustration over authorship if he had used a checklist to consider who participated in the project and whether the participation qualifies for authorship. Clearly, Sarah and April were significant contributors to the study. However it is unclear whether Jess or Norman fully qualifies for authorship. Sara says she NEEDS to be an author. Should that influence the decision about whether to make her an author? Why or why not? Pause the presentation and write down your answer if you have not already done so. [pause 3 seconds] "Need" is not a criterion for authorship. If Sara's contributions to the work meet all four of the authorship criteria, then she should be an author. Otherwise, her contributions should be recognized in the acknowledgements.
19	Despite having both journal and ICMJE guidelines, authorship assignment can still be a very challenging part of collaborative research. As in most problem-solving situations, there are good strategies for PREVENTING authorship problems as well as dealing with them. You have already started working on preventing problems by learning about established guidelines and drafting your own authorship policies. Let's discuss some of the common challenges that may arise. You may want to think about these types of issues when you revise your personal authorship policy.
20	Despite even the best planning, colleagues may disagree about authorship. Often the disagreements involve the order of authorship, that is, who should be first author and who should be second or third author. You can imagine that at the time a paper is ready to be submitted to a journal, the co-authors may start to compare their efforts to others listed on the manuscript. Ideally, you have presented the authorship list to the co-authors a number of times, but some authors may begin to feel that something is not fair in terms of authorship order. If an issue like this arises, it is important to get everyone together in one room or on

	one phone call to "go through the paper." In a meeting like this you can go through each part, section by section, figure by figure and highlight the persons who contributed to the work. As you go through it, AND use your checklist in Activity B, you may be able to better differentiate the contributions AND the significance of the contributions. If you cannot come to an agreement, seek guidance from the PI or the senior staff. In some cases, serious disagreements require mediation from an outside party. For example, if an authorship dispute is brought to the attention of a journal, often times, the journal will stop review or delay publication until the dispute is resolved and verified by an official at the academic institution. Journal publishers have no way to determine who should or should not be an author so they have to rely on the institution to make the decision.
21	In most cases, however, disagreements can be worked out among the authors. Your advisor's guidance can be very helpful. He or she may be in a better position to determine what is best for all co-authors involved. In situations like these, experience DOES matter. Even though you may not always agree with your PI's or advisor's suggestions, they have been publishing in your field of research longer than you. They likely do have a reasonable perspective on who should be included as an author, the order of authorship, when to submit the work, and to what journal. Take their suggestions into consideration.
22	The written rules say that all authors must make a substantial contribution to the paper including Intellectual, Experimental, and writing contributions along with final approval of the manuscript. Some institutions and fields have **unwritten rules** that you may have to consider. For example, in some cases, the following persons, while NOT meeting the criteria for authorship, may request and receive authorship on papers at some institutions and in some scenarios. "Guests" could be: - "Experts in the field" who provide a reagent and request authorship in exchange. - The chair of a department who requests authorship on all manuscripts from his or her staff. - Spouses, significant others, or best friends who request authorship, and - Colleagues who did absolutely nothing on your paper who request AND receive authorship. Guest or honorary authors are a big problem. The "experts" and close friends may have more citations than they should through this practice. The ICMJE guidelines are a good resource to use, and share with the corresponding author, when you think authors have been inappropriately included.

	On the other end, some contributors who qualify for authorship prefer NOT to be included as an author. They are considered to be "ghost authors." Private companies may collaborate with academic labs to run studies and publish the results associated with their products. To avoid concerns about conflict of interest, company employees may request to remain off the paper. This is NOT appropriate. Thus, it is important to count all of your contributors and fully evaluate their contribution. What can you do if you think authors have been included or excluded from your author list? As a graduate student, you may not have the authority to make final decisions about authorship. However, there are three important things you CAN do. First, be sure you understand how the professional standards of practice SHOULD be applied to your situation. Even if you don't have the authority to make the final decisions, practice how you will apply standards when you DO. Second, try to at least raise the issue in a non-threatening way. For example: "What did Dr. 'Golf-buddy down the hall' contribute to be on the paper?" "Oh, you had a good discussion about the paper while golfing? That's great. I'm glad he was interested. Do you think he would be able to explain the work to others?" "Oh, not likely. But he is always included on your cell papers because he is an expert? Honestly, that makes me uncomfortable placing so much responsibility on him. Would it be better if he was acknowledged?" With just a few phrases, you have stated your concern and suggested another option. Whether a senior scientist or advisor will address the issue is up to them. Third, you can include this scenario and the more appropriate way to handle it in your personal authorship policy.
23	Another factor that can challenge authorship is personnel changes. The laboratory environment constantly changes. New students rotate into the lab, graduate students move on to postdocs, and postdocs get jobs. Visiting scientists return to their home institutions. As such, studies are not always on the same time frame as the personnel working on them. That means that you have to think about what happens to your project when YOU move on.
24	Studies seldom get completed right at the time of your graduation. More often, there is still work to do. You will have to decide what will happen with your study. Will you stay longer and finish it? Will you pass it on to another trainee? Will you discontinue working on it altogether?

	If you leave the lab and your project is not complete, will you help from afar? Will you answer your emails from your former boss and the person who is now working on the project? Will you still be an author? Will you still be first author? It is very important to plan for your transition out of the lab and to set the expectations with your advisor or boss and your research colleagues. Maybe you will be too busy to participate, or maybe you will have a lot of time to work on a portion of the study, or maybe you want to write it. Perhaps, you do not want to be contacted at all. Discuss the future of your project BEFORE you leave the lab. Be certain to share your expectations with your advisor and be certain to listen to the expectations that your advisor has for you. Document your discussion with a confirmatory email. "To summarize our conversation today, we agreed to the following manuscript completion plan."
25	Let's look at an example of how personnel changes can affect authorship and require both planning and communication to avoid conflicts. Turn to Activity E: Major Revision Case Study in your course guide. Read the scenario and revise the original authorship checklist for the Raj and Dr. Mac manuscript based upon the changes in personnel. Pause the presentation and do the case study now. In addition to the issue raised in the case study, some might say that, since the reviewers provided the ideas for the new experiments, Jess is more like a technician instead of a researcher. Therefore, she does not qualify for authorship. Do you agree? If Jess had just set up a few experiments that did not require much intellectual effort than acknowledging the contribution to the paper may be appropriate. However, in most cases, performing experiments is much more complicated than how it looks on paper and requires both intellectual and technical expertise. Thus, completing experiments suggested by reviewers often results in authorship. Also, what do you think would have happened if Raj left the lab and DID NOT communicate again with Dr. Mac or Jess? Should he remain an author on the paper if they never heard from him again? It depends. Clearly, he was a major contributor to the work and qualifies for authorship. However, if he is unable or unwilling to work on the manuscript until it is published, then the remaining author group must make decisions without him including whether he still qualifies as the first author. It could be that Sarah or Jess does so much work to prepare the study for publication that their efforts move them to the first author position. In any case, it is important to check the change-of-authorship guidelines at the journal to be sure that it is possible to change the author list if there is not full agreement from all authors.

26	To summarize, • Authorship has value for both individuals and institutions. • There are professional standards of practice for assigning authorship. • Using professional standards, you should identify potential authors at the start of a study and revise that list as the study progresses. • You should plan ahead to prevent authorship disputes and identify strategies for dealing with them when they arise. • You should develop and maintain an authorship policy for your lab and collaborations and share your policy with your students and collaborators.
27	Now, work in small groups, or individually, to consider several other authorship scenarios by completing Activity F. These activities will help you APPLY what you have learned so far to common scenarios BE SURE to add notes from this presentation to your "My Checklist" document.
28	Thank you for listening to this presentation. To access more information about APS Professional Skills Training Courses, visit www.the-aps.org/pst.

References and Resources

1. Frische, S., It is time for full disclosure of author contributions, *Nature, 489*(7417):475, 2012 Sep 27. doi: 10.1038/489475a. http://www.nature.com/news/it-is-time-for-full-disclosure-of-author-contributions-1.11475

2. ICMJE International Committee of Medical Journal Editors. (Updated 2016) Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals. Retrieved from http://www.icmje.org/icmje-recommendations.pdf.

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Course Resources

Each of the **Professional Skills Training Courses on Best Practices for Publishing Your Research** has multiple resources to accompany the Instructor Guide. All of the following resources are available at www.the-aps.org/pst/ethics.

1. PowerPoint (.ppt) files for the Interactive Lecture. These slides are editable.
2. Instructor and Student Guides are available as editable .doc files.
3. Request form for assessment tools (quizzes and key).
4. Links to video versions of the Interactive Lecture on YouTube.
5. Links to online, on demand version of the module.

Publication Ethics Community

In addition, APS hosts a Publication Ethics Community on the Life Science Teaching Resource Community. The community posts ethics cases for comment by participants and experts. See www.lifescitrc.org and click on My Community.

Ethics CORE (Collaborative Online Resource Environment)

This website is coordinated by the National Center for Professional and Research Ethics. The site provides resources for Responsible Conduct of Research courses and seeks to create communities of responsible research and professional practice. It is an excellent source of case studies, simulations, role-play scenarios, videos, and lectures. See https://nationalethicscenter.org.

We welcome your questions and feedback on these materials.
Email us at education@the-aps.org.

Authorship Module

Student Handouts

These activities will help you:

1. Explain the importance of authorship in the context of scientific career development.
2. List the professional standards for assigning authorship and describe common authorship scenarios.
3. Apply the professional standards for assigning authorship to common scenarios to evaluate authorship claims.
4. Given a list of potential authors and their contributions to manuscript development, evaluate their appropriateness to be named an author and whether they should be listed as a first, last, or middle author on the paper.
5. Discuss the potential authors' perspectives regarding the value of authorship.
6. Discuss how mitigating factors such as personnel changes, departmental and lab policies, and corporate contributions can influence standard practices for assigning authorship.
7. Construct and justify options for establishing authorship at the beginning and revising authorship at different stages of a project (proactive negotiations).
8. Develop and revise a strategy or set of steps for preventing and resolving authorship disputes.

This module is part of the series, *"Professional Integrity: Best Practices for Publishing Your Research"* developed by:

American Physiological Society www.the-aps.org
Biomedical Engineering Society www.bmes.org
Society for Biological Engineering www.aiche.org/sbe

For information on the other modules or to take an online, interactive version of one or more modules, go to www.the-aps.org/pst.

About Your Publication Ethics Checklists

In these modules, you will be encouraged to create your OWN checklists for preparing manuscripts using ethical and professional standards of practice for researchers.

WRITE

Why do I need a checklist?

As your training progresses, your research and writing skills develop along with your knowledge of the field, your professional network, and your independence as a professional. This also means that understanding and following best practices for professional behavior, including research and publication ethics, increasingly rests on your shoulders. YOU become the person who is setting the standards for your laboratory group. YOU are the person who must establish protocols for assuring ethical behavior. And YOU are the person who has to teach standards and protocols to every trainee in your lab and, sometimes, to those with whom you collaborate. You cannot assume that they come with an understanding of best practice…you must inform, guide, and monitor their adherence to best practices.

What should I include in the checklist?

You are investing time and effort to learn best practice for publication ethics through this module (and possibly the other modules in this series). **This activity is the big "take away" from this module**. It is YOUR checklist of things to remember about publication ethics. In each module in this series, you will add a checklist of the things you want to remember from that module. You also will add notes on how you would teach this to your students in the future. For most modules, we encourage you to add three sections to your checklist:

1. **Definitions to Remember Table:** Consider adding the terms and definitions from the lecture. Also add the links for professional standards you want to access later (e.g., ICMJE criteria for authorship). Remember to add the source of your definition or text if you are copying it.
2. **My Best Practices Checklist:** What are the things you want to check as you develop or revise your manuscripts?
3. **PASS IT ON:** How will you teach this to YOUR trainees in the future? How will you share this with those with whom you collaborate?

When you are done with these modules, we encourage you to make a copy of your checklists and keep them handy for use as you develop manuscripts in the future.

Activity A
Considering Authorship Criteria

Purpose This activity will allow you to identify and compare authorship policies in journals and your own laboratories; to practice applying those criteria to your own work; and to begin generating your personal authorship criteria and procedures. After completing this activity, you will be able to identify and compare authorship policies in journals and your own laboratory, practice applying those criteria to your own work, and begin generating your own authorship criteria and procedures.

Procedure Answer the questions in all four sections below.

WRITE

For Part 3, you will need to think about a recent abstract on which you were an author along with other members of your laboratory and/or other collaborators. Ideally, print out a copy of this abstract. You will use it for other activities in the Authorship module.

Part 1: What is the authorship policy in your lab?

Ask your mentor/PI to discuss with you how s/he establishes authorship for a manuscript. Be sure to discuss and write down:

1. **Who should be an author on a paper?**

2. **Who should NOT be an author on a paper?**

3. **How do you handle needed changes in authorship that can occur as a study proceeds?**

Part 2: What will be YOUR authorship policy?

Soon YOU will be the mentor/PI of a laboratory. What will be the authorship policy in your lab? Write down in some detail how YOU will determine the following:

1. **Who should be an author on a paper?**

2. **Who should NOT be an author on a paper?**

3. **How will I handle needed changes in authorship that can occur as a study proceeds?**

Part 3: Applying Authorship Criteria

For this activity, you need to think about a recent abstract on which you were an author along with other members of your laboratory and/or other collaborators. Review the authorship list on the abstract. Use the table below to outline how each author contributed to the project or study. Give at least one reason for each author listed on the abstract.

AUTHOR NAME (initials)	**CONTRIBUTIONS TO PROJECT OR STUDY** (experimental design, data collection, data analysis, expertise, etc.)
1st author:	
2nd author:	
3rd author:	
4th author:	
5th author:	
6th author:	
7th author:	

Part 4: Journal Authorship Policies

Which journals do you read regularly? To which do you submit manuscripts? Select two or three of these journals and look for information about the journal requirements for authorship in the Information for Authors, Ethics Policy, or Authorship Criteria. Note whether the journal requires the specific contributions of each author to be described. Record what you find below.

Journal name	Where does it list authorship criteria?	Briefly, what are the criteria?	Does it require author contributions to be described?

Activity B
Worksheet for Authorship Criteria

Purpose In this activity, you will apply standard authorship criteria to your own projects and collaborations. After completing this activity, you will be able to determine who should be listed as an author on your papers and justify those choices using standard criteria.

Procedure You were asked to bring a recent abstract on which you were an author. Imagine that this abstract and research is now being translated into a journal manuscript.

READ

Use the worksheet below and on the following page to determine who should be an author on the manuscript. Be sure to read the brief excerpt from the ICMJE guidelines below.

Authorship Criteria Worksheet

Project title	
Draft manuscript title	
Today's date	
Deadline for completion & submission of draft manuscript	
Submission to which Journal (in accordance with the Journal's authorship criteria)	

Contributor's name	**Provided experimental contribution(s)** (generation of raw data, data analysis, figures, tables)	**Provided intellectual contribution(s)** (experimental design, project guidance, data Interpretation)	**Drafted/edited portion(s) of manuscript** (prepared entire draft, section of draft, significant editing)	**Revised/ approved final version** (all authors must read and approve final version of draft)	**Provided services and/or resources** (reagents, core services, technical assistance, helpful discussions)

ICMJE GUIDELINES	
According to ICMJE guidelines, ***"Authorship credit should be based on the following 4 criteria:*** 1. ***providing substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; AND*** 2. ***drafting the article or revising it critically for important intellectual content; AND*** 3. ***final approval of the version to be published; AND*** 4. ***agreeing to be accountable for all aspects of the work and address concerns raised regarding the accuracy and integrity of the work."***	
As of __/___/___, the following contributors have made a substantial contribution to qualify for authorship, in the following order.	
As of __/___/___, the following contributors should be noted in the Acknowledgments section for their roles in this work.	

WRITE

REMEMBER: Note ideas that you want to add to your My Authorship Checklist.

Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals:[1]

II. Roles and Responsibilities of Authors, Contributors, Reviewers, Editors, Publishers, and Owners

A. Defining the Role of Authors and Contributors

1. Why Authorship Matters

Authorship confers credit and has important academic, social, and financial implications. Authorship also implies responsibility and accountability for published work. The following recommendations are intended to ensure that contributors who have made substantive intellectual contributions to a paper are given credit as authors, but also that contributors credited as authors understand their role in taking responsibility and being accountable for what is published.

Because authorship does not communicate what contributions qualified an individual to be an author, some journals now request and publish information about the contributions of each person named as having participated in a submitted study, at least for original research. Editors are strongly encouraged to develop and implement a contributorship policy, as well as a policy that identifies who is responsible for the integrity of the work as a whole. Such policies remove much of the ambiguity surrounding contributions, but leave unresolved the question of the quantity and quality of contribution that qualify an individual for authorship. The ICMJE has thus developed criteria for authorship that can be used by all journals, including those that distinguish authors from other contributors.

2. Who Is an Author?

The ICMJE recommends that authorship be based on the following 4 criteria:

- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- Drafting the work or revising it critically for important intellectual content; AND
- Final approval of the version to be published; AND
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

In addition to being accountable for the parts of the work he or she has done, an author should be able to identify which co-authors are responsible for specific other parts of the work. In addition, authors should have confidence in the integrity of the contributions of their co-authors.

All those designated as authors should meet all four criteria for authorship, and all who meet the four criteria should be identified as authors. Those who do not meet all four criteria should be acknowledged —see Section II.A.3 below. These authorship criteria are intended to reserve the status of authorship for those who deserve credit and can take responsibility for the work. The criteria are not intended for use as a means to disqualify colleagues from authorship who otherwise meet authorship criteria by denying

[1] Excerpt from: http://www.icmje.org/icmje-recommendations.pdf

them the opportunity to meet criterion #s 2 or 3. Therefore, all individuals who meet the first criterion should have the opportunity to participate in the review, drafting, and final approval of the manuscript.

The individuals who conduct the work are responsible for identifying who meets these criteria and ideally should do so when planning the work, making modifications as appropriate as the work progresses. It is the collective responsibility of the authors, not the journal to which the work is submitted, to determine that all people named as authors meet all four criteria; it is not the role of journal editors to determine who qualifies or does not qualify for authorship or to arbitrate authorship conflicts. If agreement cannot be reached about who qualifies for authorship, the institution(s) where the work was performed, not the journal editor, should be asked to investigate. If authors request removal or addition of an author after manuscript submission or publication, journal editors should seek an explanation and signed statement of agreement for the requested change from all listed authors and from the author to be removed or added.

The corresponding author takes primary responsibility for communication with the journal during the manuscript submission, peer review, and publication process, and typically ensures that all the journal's administrative requirements, such as providing details of authorship, ethics committee approval, clinical trial registration documentation, and gathering conflict of interest forms and statements, are properly completed, although these duties may be delegated to one or more coauthors. The corresponding author should be available throughout the submission and peer review process to respond to editorial queries in a timely way, and should be available after publication to respond to critiques of the work and cooperate with any requests from the journal for data or additional information should questions about the paper arise after publication. Although the corresponding author has primary responsibility for correspondence with the journal, the ICMJE recommends that editors send copies of all correspondence to all listed authors.

When a large multi-author group has conducted the work, the group ideally should decide who will be an author before the work is started and confirm who is an author before submitting the manuscript for publication. All members of the group named as authors should meet all four criteria for authorship, including approval of the final manuscript, and they should be able to take public responsibility for the work and should have full confidence in the accuracy and integrity of the work of other group authors. They will also be expected as individuals to complete conflict-of-interest disclosure forms.

Some large multi-author groups designate authorship by a group name, with or without the names of individuals. When submitting a manuscript authored by a group, the corresponding author should specify the group name if one exists, and clearly identify the group members who can take credit and responsibility for the work as authors. The byline of the article identifies who is directly responsible for the manuscript, and MEDLINE lists as authors whichever names appear on the byline. If the byline includes a group name, MEDLINE will list the names of individual group members who are authors or who are collaborators, sometimes called non-author contributors, if there is a note associated with the byline clearly stating that the individual names are elsewhere in the paper and whether those names are authors or collaborators.

3. Non-Author Contributors

Contributors who meet fewer than all 4 of the above criteria for authorship should not be listed as authors, but they should be acknowledged. Examples of activities that alone (without other contributions) do not qualify a contributor for authorship are acquisition of funding; general supervision of a research group or general administrative support; and writing assistance, technical editing, language editing, and proofreading. Those whose contributions do not justify authorship may be acknowledged individually or together as a group under a single heading (e.g. “Clinical Investigators” or “Participating Investigators”), and their contributions should be specified (e.g., “served as scientific advisors,” “critically reviewed the study proposal,” “collected data,” “provided and cared for study patients”, “participated in writing or technical editing of the manuscript”).

Because acknowledgment may imply endorsement by acknowledged individuals of a study’s data and conclusions, editors are advised to require that the corresponding author obtain written permission to be acknowledged from all acknowledged individuals.

Activity C
My Authorship Checklist

Purpose With this activity, you will use what you have learned to establish a policy for authorship for your own collaborations and projects that is based on accepted criteria and best practices for ethical writing. After completing this activity, you will be able to explain your policy on authorship to collaborators and students.

Procedure In Activity A: Part 2, you wrote down your first thoughts about a personal authorship policy. Using what you have learned about accepted criteria and best practices expand upon that policy here.

WRITE

First, add some important definitions and links to your authorship policy checklist and then use the following Guiding Questions to develop your policy. Consider how you would answer each question if asked by your collaborators and students.

Definitions and Resources to Remember	
ICMJE criteria for authorship	**1.** **2.** **3.** **4.**
ICMJE URL	
Ghost author	
Guest author	
Acknowledgement	
No paper, never happened	
No publication, no progress	
No publication, no credit	

Guiding Questions

1. Who should be an author on a paper? On what do you base that policy?

2. Who should NOT be an author on a paper? On what do you base that policy?

3. Who should be recognized in the acknowledgments rather than as an author? How do you decide that?

4. When will you first discuss and establish authorship on a paper?

5. How will you document that discussion?

6. How will you handle needed changes in authorship that can occur as a study proceeds? On what do you base that policy?

7. How will you document the discussion and decisions to change the authorship?

8. How will you handle guest authorships and ghost authorships?

9. How will you handle authorship disagreements with your students?

10. How will you handle authorship disagreements with collaborators?

11. How will you deal with changes in laboratory staff that lead to authorship changes on manuscripts?

PASS IT ON

1. How will you teach your authorship policy to your students?

2. How will you teach your trainees to plan for changes in authorship as they leave the lab after graduation or move to other positions?

Activity D
Authorship Expectations Case Study

Purpose This activity helps you learn to apply authorship criteria in a real life scenario. After completing this activity, you will be able to determine who should be listed as an author on your papers and justify those choices using standard criteria.

Procedure Work in small groups to discuss the following scenario. Be ready to share your group's ideas with the rest of the class.

DISCUSS

Read the following scenario and write down your answers to the questions, then discuss with your group. Try to apply what you have learned about best practices for publication ethics.

Case Study: Why not me?

Dr. Mac started her lab 4 years ago. Her lab is active and growing. Right now, there are three graduate students in the lab (Sarah, 4th yr.; Raj, 3rd yr.; and Jess, 1st yr.), as well as a research technician, Norman, and two part-time undergraduate students, April and Becky. Dr. Mac encourages everyone to work together on their projects with the theory that if one does well, everyone benefits.

Raj's research project is going well. He has started to prepare the results for publication and has almost finished the first draft of his manuscript. Dr. Mac asks him to present the outline of his manuscript at the next lab meeting to discuss how best to complete the manuscript for publication.

At the next lab meeting, Raj presents to the group the title "Sugar water increases body mass of Wnt10b mice" and "Raj Nice and Henrietta Mac" as the authors of his draft manuscript. Several lab members provide immediate feedback.

Sarah: "Why am I not on the authorship list? I taught you everything you know! And the cell culture data in the paper were done by me, not you. I NEED to be an author on this paper!"

Jess: "Yeah, I mean I fed the mice the sugar water every day for 6 months. You said that if I helped you, I would be an author."

Sarah: "And what about Norman? He did all of the assays. You just analyzed the results."

Norman: "The assays were routine work. Raj, I'm glad your study went so well."

April: "I didn't necessarily think that I would be an author, but I did help you every afternoon for the past year and a half. I even did parallel studies to rule out some of your experimental candidates. Does that qualify for authorship?"

1. **Should Raj revise his authorship list? Why or why not?**

2. **If so, what do you suggest and why? (USE the worksheet)**

3. **How could Raj have avoided this tense situation?**

WRITE

REMEMBER: **Note ideas that you want to add to your My Authorship Checklist.**

Activity E
Major Revision Case Study

Purpose This activity helps you learn to apply authorship criteria in a real life scenario. After completing this activity, you will be able to adapt an authorship plan as the participants in your work change over time. You will be able to identify the stakeholders' perspectives and recognize the value of authorship to each (PI, student, postdoc, technician, etc.).

Procedure Work in small groups to discuss the following scenario. Be ready to share your group's ideas with the rest of the class.

DISCUSS

Read the scenario and write down your answers to the questions, then discuss with your group. Try to apply what you have learned about best practices for publication ethics.

Case Study: Major Revision

Raj submits his paper entitled "Sugar water increases body mass of Wnt10b mice" by "Raj Nice, Sarah Roswell, April Smith, and Henrietta Mac" to *AJP-Endocrinology and Metabolism*. The reviews come back: "MAJOR REVISION." The reviewers note that he needs to do more mouse and cell culture experiments to rule out some alternative interpretations of the data.

Raj had not planned to do any more work on this paper. In fact, he is scheduled to defend his thesis in just 2 weeks and start a postdoc in 4 weeks. Dr. Mac suggests that he ask Jess to perform the experiments that the reviewers have suggested. Raj agrees with Dr. Mac, and he asks Jess to finish up the paper. Dr. Mac even promises to add Jess as an author.

Six months later, Dr. Mac meets with Jess to discuss the revised paper. Dr. Mac notices that Jess's name is now listed as second author and asks her to explain the order.

Jess replies: "I have been working on these revisions all day for 6 months. Raj and Sarah have both left the lab and have not been much help besides reviewing the revised manuscript. I performed the requested experiments, revised the manuscript, and even re-did some of Raj's experiments to confirm the results with the new reagents. I deserve to be second author, possibly even first author considering that the paper would not be published without my effort."

1. **Do you agree with Jess? Why or why not?**

2. **Should Raj remain as first author? Why or why not?**

3. **Should Jess be included as an author at all? Why or why not?**

4. **What should Dr. Mac do to determine how best to revise the authorship list?**

5. **What should be the final order of the authorship list? Should anyone be acknowledged?**

6. **What should Dr. Mac do to avoid these situations in her lab in the future?**

WRITE

REMEMBER: Note ideas that you want to add to your My Authorship Checklist.

Activity F
Authorship Scenario Role Plays

Purpose In this activity, you will role play some common authorship scenarios. After completing this activity, you will be able to make choices about how to handle common authorship situations and justify those choices using standard criteria.

Procedure In groups, decide who will play which role and present the scenario to the rest of the class. Then, using the Discussion Questions, identify the problem and decide how to address the matter.

WATCH

NOTE: There is likely more than one way to address the problem. Thus, consider presenting the case as if it were a movie/TV show and present several alternative endings. Role playing is a great way to practice how you would handle a situation, whether it is an authorship issue or other work scenarios.

DISCUSS

After doing all of the role plays, discuss the following questions as a class.

- How could Dr. Samuels help her lab group understand how she assigns authorship?
- To what standards should she adhere in assigning authorship?
- As students leave the lab and new ones arrive, how can she ensure they learn about authorship?

Scenario 1: My Study is Really Important!

Characters

Graduate Student: Yan
Graduate Student: Matthew

Yan: Hey Matt! How are you doing? You look a little sad.

Matthew: Oh, I just finished meeting with Dr. Samuels, and we do not agree on where we should send the paper.

Yan: Where do you want it to be published?

Matthew: In {*Science, Cell, Nature*, top journal of your field}. I mean my paper is really good, and I put a lot of hard work into it. I want it to be in the best journal. Aim high, right?

Yan: And Dr. Samuels suggested…?

Matthew: She suggested that I submit it to a journal within our field because she doesn't think it will be well received in a big-name journal. She says that submitting it to a big-name journal would be a waste of my time. I guess I thought first authors got to choose where to send the paper. Apparently, that is not how it works in our lab.

Discussion Questions

- **Can Yan offer any guidance?**

- **What perspectives should Matt consider?**

Scenario 2: I Thought I Was First Author

Characters

Graduate Student: Yan
Graduate Student: Matthew
Principal Investigator: Dr. Samuels

Dr. Samuels: Yan and Matthew, I had a great idea last night. Since both of your studies are leading to the same overall result. I think you two should combine your findings and publish one large paper. It would make a huge impact in the field.

Yan: Well, that would be good, I guess. It would be nice to show Matt's mechanistic work as an introduction to my *in vivo* paper.

Matthew: Right, I mean, her *in vivo* work would be a good conclusion to my paper.

Yan: Wait, I'm not putting my work in your paper. Dr. Samuels, if we combine our papers, who will be first author?

Discussion Questions

- **Should Yan and Matt be concerned about combining their studies into one manuscript?**
- **How could Dr. Samuels respond?**
- **Are there other options?**

Scenario 3: An Extra Piece of Data

Characters

Graduate Student: Matthew
Principal Investigator: Dr. Samuels

Dr. Samuels: Great news, Matthew! The scientist from Mechanistix Company sent over some data that she thought would support the findings in your study.

Matthew: Wow! The results showing the effect of their drug on our cells are fantastic. Can these data go in my paper?

Dr. Samuels: Yes! And because we have the new data, I think we should submit your paper to the high-impact journal that you suggested last week.

Matthew: Great. So, who from the company should be added as an author?

Dr. Samuels: You know, she didn't mention authorship. I'll ask, but it may be just a routine study and we do not need to include them at all.

Discussion Question

- **What information should Matthew need to receive before including these new data in his manuscript?**

Scenario 4: I Wrote That?

Characters

Graduate Student: Yan
Principal Investigator: Dr. Samuels

Yan: Hey, Dr. Samuels, can I talk to you for a moment?

Dr. Samuels: Of course!

Yan: I was online doing a publication search for the paper the lab published last year, and I was surprised to see one on the list with my name included as an author. I don't remember this work at all.

Dr. Samuels: Oh yeah, that was the study that we were working on when you were volunteering here as an undergraduate.

Yan: But why am I on the paper? All I did was wash dishes and make solutions.

Dr. Samuels: Well, you were very helpful that year, so we thanked you. You're welcome!

Discussion Questions

- **Why would Yan be concerned about being listed as an author on this article?**

- **What criteria for authorship should Dr. Samuels have considered?**

- **Could Yan have been thanked in a different way?**

Scenario 5: The Simple Request

Characters

Graduate Student: Yan
Graduate Student: Matthew

Yan: I just received the comments back from our collaborators in Europe. Most of their suggestions about how to revise the paper are helpful. But Pierre, the graduate student, asked me to add his department chair to the authorship list.

Matthew: So, what's the big deal? I'm sure he must have contributed to the paper. Right?

Yan: I do not think so. Pierre said that the department chair is listed on all of the department papers and he has to be included on this one, as well.

Discussion Questions

- **Should Yan be concerned about adding the department chair as an author to the manuscript?**

- **What resources could Yan use to help address the matter?**

Scenario 6: The Middle Author

Characters

Graduate Student: Matthew
Principal Investigator: Dr. Samuels

Dr. Samuels: Hey Matt, I have a great opportunity for you.

Matthew: Really? What is it?

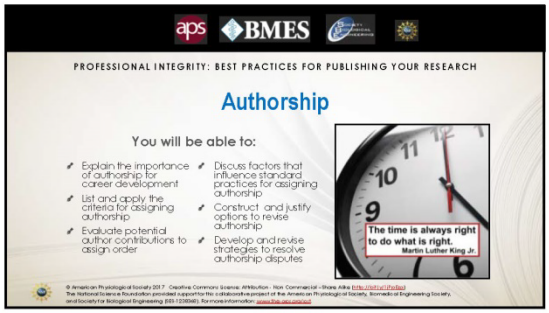
Dr. Samuels: Our collaborators have a paper that is almost ready for publication. They need someone to run a few assays to confirm that the drug used in the study is suppressing the target protein. Could you run the assays, analyze the data, and write up the section? They would add your name to the authorship list. It would be good for your CV.

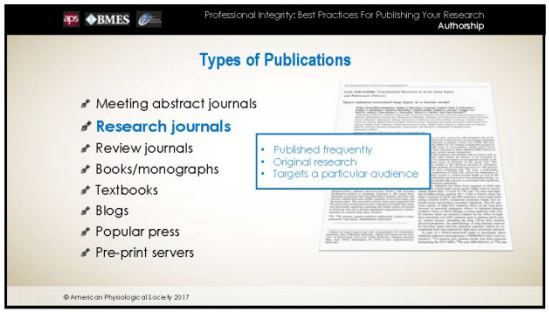
Matthew: Wow. That is a nice opportunity. I am a little stressed about my own project. I really want to get my first-authored paper published this year. I'm not sure it is a good idea for me to get another "middle author" paper. I am already on 5 papers but I still do not have one "first-author" paper.

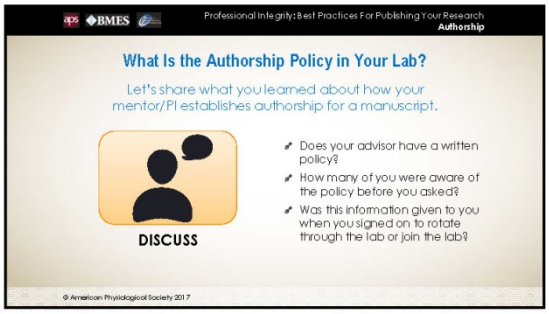
Discussion Question

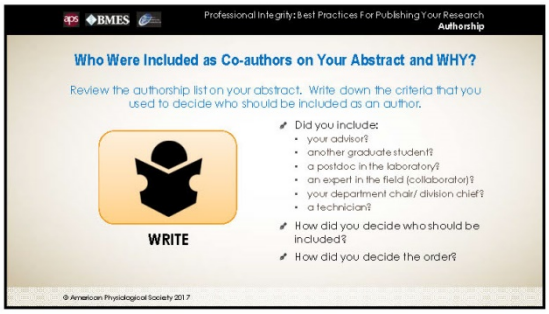
- **What could Dr. Samuels say in response to Matthew's concerns? Are there other perspectives or options to consider?**

Student Slide Handout








Professional Integrity: Best Practices For Publishing Your Research
Authorship
Who Were Included as Co-authors on Your Abstract and WHY?
Review the authorship list on your abstract. Write down the criteria that you used to decide who should be included as an author.
WRITE
Did you include:
your advisor?
another graduate student?
a postdoc in the laboratory?
an expert in the field (collaborator)?
your department chair/ division chief?
a technician?
How did you decide who should be included?
How did you decide the order?
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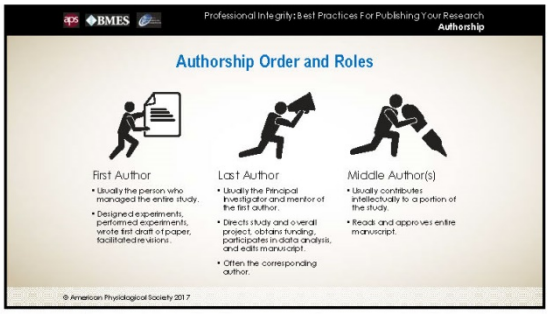
Professional Integrity: Best Practices For Publishing Your Research
Authorship
Authorship Order and Roles
First Author
Usually the person who managed the entire study.
Designed experiments, performed experiments, wrote first draft of paper, facilitated revisions.
Last Author
Usually the Principal Investigator and mentor of the first author.
Directs study and overall project, obtains funding, participates in data analysis, and edits manuscript.
Often the corresponding author.
Middle Author(s)
Usually contributes intellectually to a portion of the study.
Reads and approves entire manuscript.
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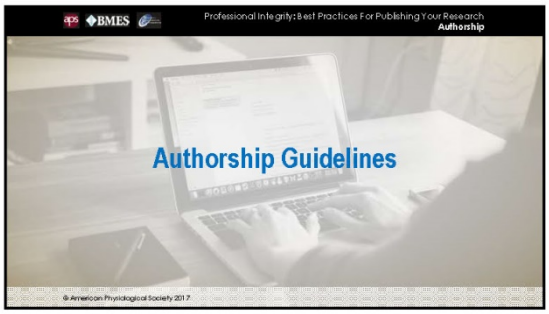
Professional Integrity: Best Practices For Publishing Your Research
Authorship
Authorship Guidelines
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Professional Integrity: Best Practices For Publishing Your Research
Authorship

Where Do You Find the Authorship Criteria for Your Particular Publication?

Many journals now require that the specific contributions of each author be indicated in the paper

The journal website…

- Information for Authors
- Ethics Policy
- Authorship Criteria

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International Committee of Medical Journal Editors (ICMJE) Criteria for Authorship

- ☑ Provided substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; and
- ☑ Drafted the article or revised it critically for important intellectual content; and
- ☑ Approved the final version to be published; and
- ☑ Agreed to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Contributors must meet ALL 4 criteria to be included as an author

International Committee at Medical Journal Editors: www.icmje.org

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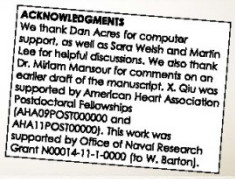
Acknowledgment vs. Authorship

Acknowledge a contributor who does not meet all 4 criteria (ICMJE) for authorship and/or the guidelines set by the journal.

Acknowledge…

- Intellectual contributions
- Technical/reagent contributions
- Financial contributions (grants, fellowships, awards)


ACKNOWLEDGMENTS

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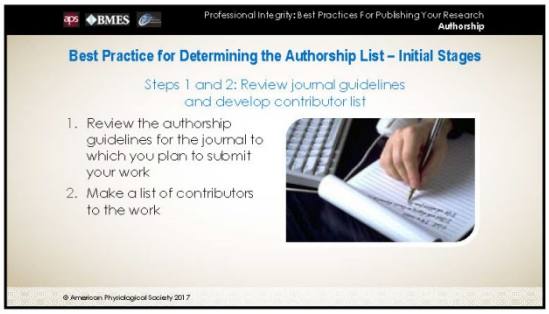
Professional Integrity: Best Practices For Publishing Your Research
Authorship
Best Practice for Determining the Authorship List – Initial Stages
Steps 1 and 2: Review journal guidelines and develop contributor list
1. Review the authorship guidelines for the journal to which you plan to submit your work
2. Make a list of contributors to the work
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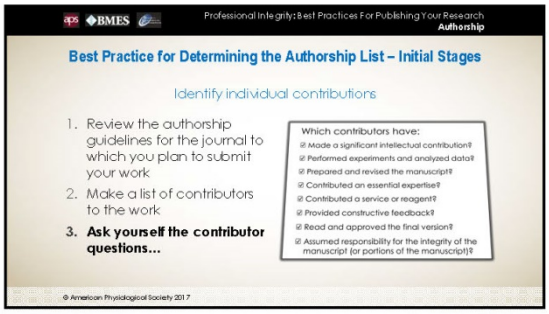
Professional Integrity: Best Practices For Publishing Your Research
Authorship
Best Practice for Determining the Authorship List – Initial Stages
Identify individual contributions
1. Review the authorship guidelines for the journal to which you plan to submit your work
2. Make a list of contributors to the work
3. Ask yourself the contributor questions…
Which contributors have:
Made a significant intellectual contribution?
Performed experiments and analyzed data?
Prepared and revised the manuscript?
Contributed an essential expertise?
Contributed a service or reagent?
Provided constructive feedback?
Read and approved the final version?
Assumed responsibility for the integrity of the manuscript (or portions of the manuscript)?
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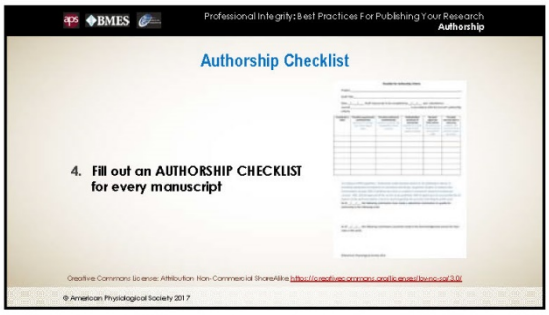
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Authorship
Authorship Checklist
4. Fill out an AUTHORSHIP CHECKLIST for every manuscript
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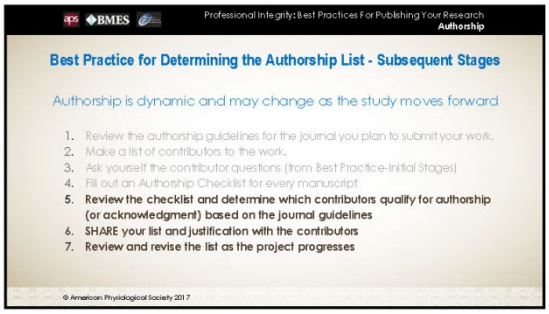


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Authorship
Authorship Challenges
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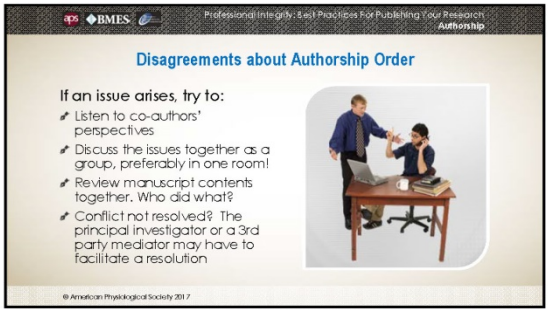
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Authorship
Disagreements about Authorship Order
If an issue arises, try to:
Listen to co-authors' perspectives
Discuss the issues together as a group, preferably in one room!
Review manuscript contents together. Who did what?
Conflict not resolved? The principal investigator or a 3rd party mediator may have to facilitate a resolution
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Authorship
Disagreements about Authorship Order
If an issue arises, try to:
Experience Counts
Your advisor may recommend:
Authorship order
Time to submit the manuscript
Journal to which you submit your work
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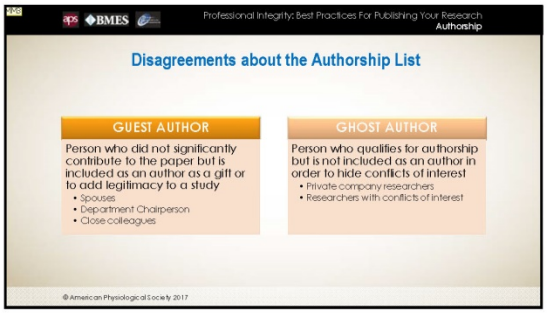

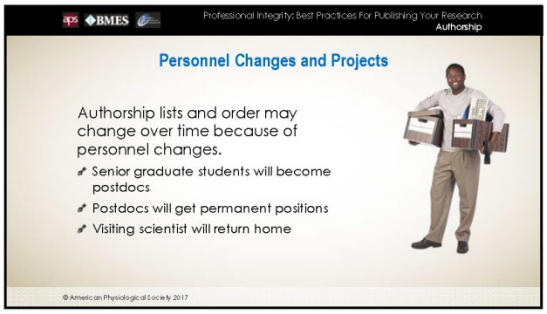

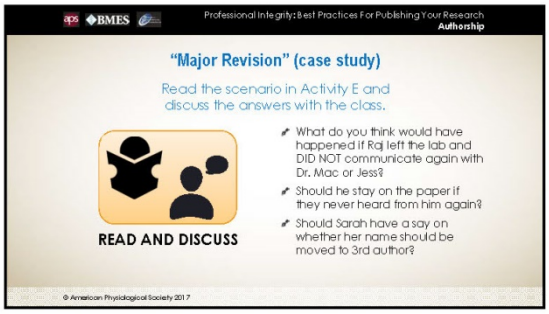
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"Major Revision" (case study)
Read the scenario in Activity E and discuss the answers with the class.
READ AND DISCUSS
What do you think would have happened if Raj left the lab and DID NOT communicate again with Dr. Mac or Jess?
Should he stay on the paper if they never heard from him again?
Should Sarah have a say on whether her name should be moved to 3rd author?
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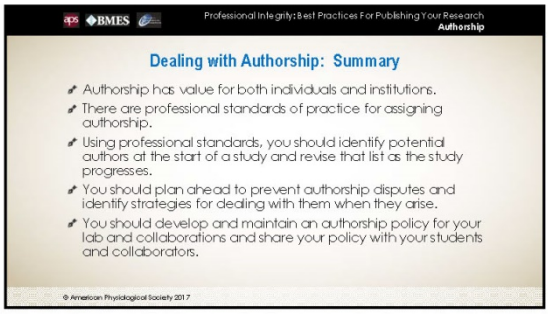
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Dealing with Authorship: Summary
Authorship has value for both individuals and institutions.
There are professional standards of practice for assigning authorship.
Using professional standards, you should identify potential authors at the start of a study and revise that list as the study progresses.
You should plan ahead to prevent authorship disputes and identify strategies for dealing with them when they arise.
You should develop and maintain an authorship policy for your lab and collaborations and share your policy with your students and collaborators.
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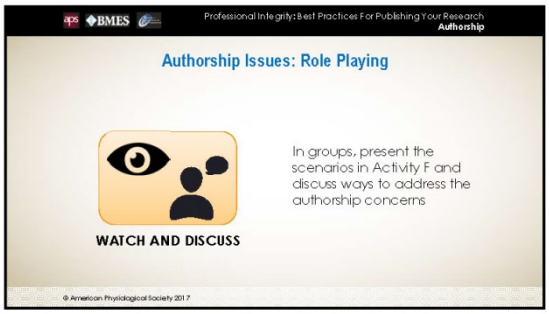
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Authorship Issues: Role Playing
WATCH AND DISCUSS
In groups, present the scenarios in Activity F and discuss ways to address the authorship concerns
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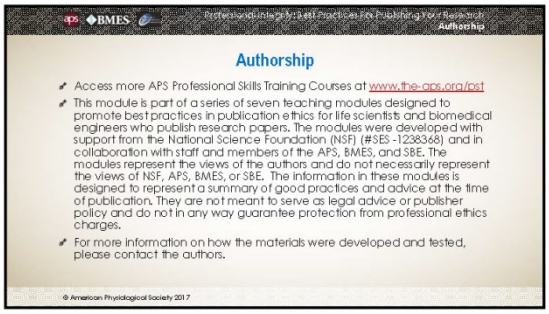

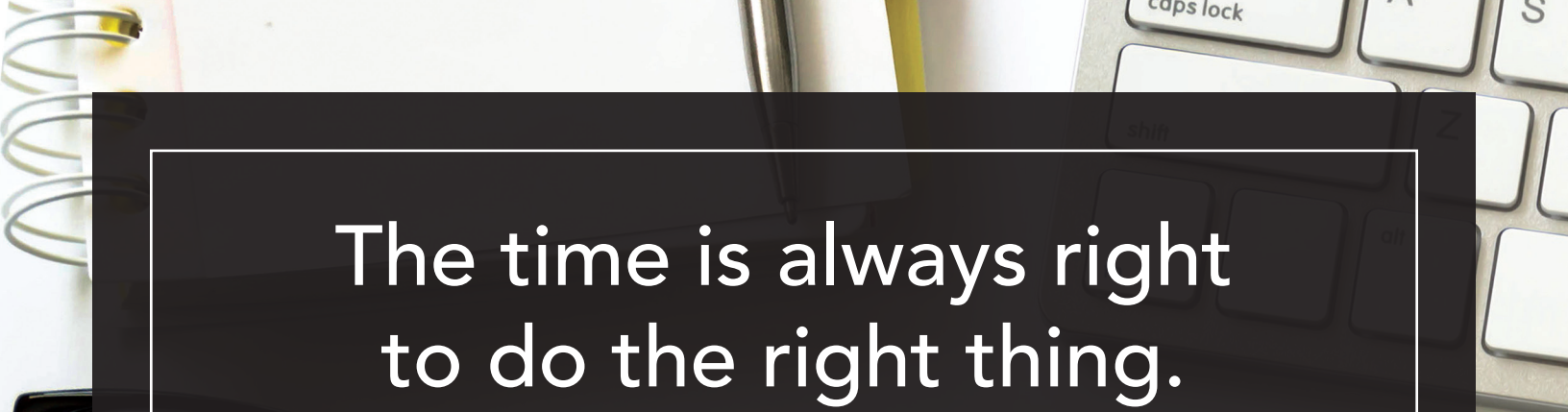

The time is always right to do the right thing.

—Martin Luther King Jr.

AUTHORSHIP is one of seven teaching modules designed to promote best practices in publication ethics for life scientists and biomedical engineers who publish research papers. Each module provides information on and principles of the most common publication ethics issues as well as the tools needed to integrate and apply professional standards of practice to real life situations. After finishing each module, students will have a personal checklist to use in the preparation of future manuscripts AND a plan for teaching module principles to their future trainees and collaborators.

Modules are designed to be used by higher education institutions, laboratory groups, individuals, and professional societies. The teaching paradigms used in the modules support various types of learners and were designed to integrate into current Responsible Conduct of Research (RCR) training courses/programs.

Modules were developed with support from the National Science Foundation (NSF) (#SES -1238368) and in collaboration with staff and members of the American Physiological Society, Biomedical Engineering Society, and the Society for Biological Engineers.

Handouts for instructor and students, audio and video resources, and online course links are available at www.the-aps.org/pst for all seven modules:

- Authorship
- Conflicts of Interest
- Considerations for Animal and Human Studies
- Data Fabrication and Falsification
- Data Management and Integrity
- Overlapping Publications
- Text Preparation and Avoiding Plagiarism