

Publish or perish: The art of research and scientific writing

Publishing in peer-reviewed journals is a crucial skill for students who intend to pursue careers in academia. Aim of the course is to introduce graduate students in bio- and medical-sciences to challenges in performing research and publishing in peer-reviewed journals. The course will combine (1) short workshops and discussions on topics related to writing productivity, (2) “read and critique” writing group meetings, and (3) seven lectures by experienced scholars on how to turn projects into published articles.

Outside class, students will write and revise their manuscripts for publication according to “How to Write & Publish a Scientific Paper” Robert A. Day, 5th edition 1998.

The course will consist of lectures 2h/week (code D01), practical 3h/week (code S5040), and workshop 19-20.9. (code S5041).

Course Requirements and Grading: The course is intended for advanced PhD students that have accumulated sufficient results to start writing a manuscript for publication. Grades will be computed based on success at completing the weekly assignments (70%), the quality of final paper (20%), and on class participation (10%). Getting a manuscript accepted for publication is the ultimate goal of this course, but an acceptance from a journal is not required to get a good grade. Instead, **grades in this course are designed to reward determination and persistence in pursuit of publication.**

Course plan:

Lecture – Introduction to publication process.

Week 1. Plan your writing; write Title and Abstract

- Instead of starting from scratch, think about what you’ve already written. Your lab notes, research reports, a paper you presented at a conference, or a master’s thesis are texts you can revise for publication. Revising is the key to publication; it is always easier to rework an existing text.
- Determine the main result to be presented in the article. Publishable articles tell something new about something old. The “new” idea doesn’t have to be an original idea, but it should bring new knowledge to the topic. Writing an abstract will help solidify your argument and provide a guide as you work through your revisions.

Title:

- Make your title specific enough to describe the contents of the paper, but not so technical that only specialists will understand. The title should be appropriate for the intended audience.
- The title usually describes the subject matter of the article: Effect of Smoking on Academic Performance
- Sometimes a title that summarizes the results is more effective: Students Who Smoke Get Lower Grades

Abstract:

- An abstract, or summary, is published together with a research article, giving the reader a "preview" of what's to come. It allows other scientists to quickly scan the large scientific literature, and decide which articles they want to read in depth. The abstract should be a little less technical than the article itself; you don't want to dissuade your potential audience from reading your paper.
- Your abstract should be one paragraph, of 100-250 words, which summarizes the purpose, methods, results and conclusions of the paper.

- It is not easy to include all this information in just a few words. Start by writing a summary that includes whatever you think is important, and then gradually prune it down to size by removing unnecessary words, while still retaining the necessary concepts.
- Don't use abbreviations or citations in the abstract. It should be able to stand alone without any footnotes.

Practical: Discuss your previous writing experience and prepare writing plan with assigned colleagues. Discuss your article title with colleagues. Groups of five.

Homework: Write title (maximum length 90 characters) and abstract (maximum length 250 words) according to: "How to write Nature summary paragraph". Write outline of introduction, results, and discussion sections.

Week 2. Select a journal, and write materials and methods section

- Finding the right journal for your article is essential. Your adviser and colleagues can provide suggestions of journals that may be appropriate for your article. Send them your abstract to help them better understand the type of article you're writing. You also can find potential journals by reviewing your citations and bibliographies and checking out electronic databases. After identifying your short list, evaluate each journal to determine which is the best fit.
- Materials and methods must be described in sufficient detail to allow expert in the field to reproduce your results.

Practical: Peer-review of abstract, title, and manuscript outline – groups of three.

Homework: Re-write title and abstract according to input from peer-review. Adjust the outline of results and discussion sections accordingly. Select three journals suitable for publication of your manuscript. Provide reasons for selecting them. Write materials and methods section.

Week 3. Introduction 1: review related literature and write introduction

- What question did you ask in your experiment? Why is it interesting? The introduction summarizes the relevant literature so that the reader will understand why you were interested in the question you asked. One to four paragraphs should be enough. End with a sentence explaining the specific question you asked in this experiment.

Practical: Peer-review of materials and methods, discuss your journal selection – groups of three.

Homework: Re-write materials and methods according to input from peer-review. Write introduction (**maximum length 1,150 words**).

Week 4. Introduction 2

Practical: Peer-review of introduction – groups of three.

Homework: Re-write introduction based on peer-review

Week 5. Results 1

- This is where you present your results. Use figures, graphs, and tables if appropriate, but also summarize your main findings in the text. Do NOT discuss the results or speculate as to why something happened; that goes in the Discussion.
- You don't necessarily have to include all the data you have. Present only the information relevant for the story of the article. This isn't a diary.
- Use appropriate methods of showing data. Don't try to manipulate the data to make it look like you did more than you actually did. ("The drug cured 1/3 of the infected mice, another 1/3 were not affected, and the third mouse got away.")

Practical: Peer-review of introduction – groups of three.

Homework: Correct title, abstract, and introduction based on peer-review **within one day and send them for expert review**. Write results section. Prepare figures, graphs, and tables with results.

Expert review of title, abstract and introduction. (Max 1,500 words)

Week 6. Results 2 – tables, graphs, and figures; figure legends

- If you present your data in a figure, table, or graph, include a title describing what's in the table ("Enzyme activity at various temperatures"). For graphs, label the x and y axes.
- Don't use a table, graph, or figure just to be "fancy". If you can summarize the information in one sentence, then a table or graph is not necessary.

Practical: Peer-review of Results – groups of three.

Homework: Correct title, abstract, and introduction based on expert review. Re-write the results section based on peer-review. Write figure legends.

Week 7. Discussion 1

- Highlight the most significant results, but don't just repeat what you've written in the Results section. How do these results relate to the original question? Do the data support your hypothesis? Are your results consistent with what other investigators have reported? If your results were unexpected, try to explain why. Is there another way to interpret your results? What further research would be necessary to answer the questions raised by your results? How do your results fit into the big picture?

Practical: Peer-review of Results and figures, graphs, and tables – groups of three.

Homework: Correct the Results section and figure legends based on peer-review. Write discussion section. **Maximum length of whole article is 4,100 words.**

Week 8. Discussion 2

Practical: Peer-review of Discussion – groups of three.

Homework: Re-write discussion based on peer-review

Week 9. Discussion 3 - Check structure and “flow” of your article. Citations.

- Structure your manuscript to provide a natural flow that will lead readers through the article. In addition to aiding your readers, an organized structure will help you connect your ideas. Outlining structure in an existing article before starting on your own is a good practice.
- Rules for selecting and including citations in the manuscript.

Practical: Peer-review of Discussion – groups of three.

Homework: Re-write discussion based on peer-review

Week 10. Discussion 4 and Cover letter. Give, get and use others’ feedback.

- Send out your article to your adviser and colleagues with a request for feedback. Be sure to let your readers know what kind of feedback you need – for example, you may just need someone to help find typos and errors, or you may want a reviewer to tell you whether the article comes together at the end.

Practical: Peer-review of the whole article – groups of two.

Homework: Correct “flow” of your article based on peer-review **within one day and send it for expert review**. Send your manuscript for review to your supervisor and colleagues. Write cover letter (**maximum length 400 words**).

Expert review of the manuscript. (The article must be shorter than 4,100 words, excluding references.)

Week 11. Revise your title and abstract.

- Revise your title. The title of your article will have a life of its own long after your article is published. It will appear on your CV and in electronic searches. It needs to be a clear invitation to your discussion and should be easily found in an online search.

Practical: Peer-review of the cover letter – groups of three. Discussion of manuscripts.

Homework: Correct the manuscript based on expert review, input from your colleagues, and peer review. Re-write title and abstract if necessary. Correct the Cover letter based on peer-review.

Week 12. Final polishing!

Practical: Peer-review of the whole article and Cover letter – groups of three.

Homework: Re-write your manuscript and Cover letter based on input from peer-review and comments from your colleagues within one day and send them for expert review.

Send your manuscript and cover letter for review to your supervisor and colleagues. Prepare list of five selected reviewers and, if necessary, of rejected reviewers. Prepare list of keywords.

Expert review of the manuscript and cover letter. (Total maximum 4,500 words.)

Week 13. Submit your article (and get ready for revisions)

- Now that your article is finished, it's time to begin the submission process.

Practical: Discussion of comments from expert review – groups of three.

Homework: Re-write your manuscript based on input from the expert review, peer-review, and comments from your colleagues. **You have 7 days to submit your manuscript and cover letter for grading.** Submit your manuscript to a journal.

