



Writing Science: How to write and publish scientific papers *Vetenskapligt skrivande: Att skriva och publicera vetenskapliga artiklar*

Credit points: 5 ECTS

Course code: 5DN003

Established: 2015-11-02; rev 2019-02-26

Established by: Committee for doctoral studies

Syllabus valid from: 2015-11-02

Responsible Department: Faculty of Medicine: Department of Radiation Sciences, Faculty of Science and Technology: Department of Physics

Main field of study: General science

Grading system: G pass, U Fail

Level of Education: Doctoral course

1. Required Knowledge

Admitted to students at third cycle-level, corresponding to doctoral students that have written or are writing a scientific manuscript.

2. Expected learning outcomes

After completing the course, students shall be able to:

Knowledge and understanding

- describe and explain the fundamental structure of a scientific article
- describe an underlying philosophy and associated techniques that together provide a systematic approach to scientific writing
- explain how the publishing process works

Competence and skills

- write a scientific manuscript with a clear structure, flow, and story arc
- review scientific articles with respect to structure and style

Judgement and approach

- evaluate and analyze scientific articles from a writing-style perspective
- assess gender biases in scientific publishing and discuss how to confront them.

3. Contents

This course teaches advanced science writing. The ability to write scientific papers is a central skill and critical to the success of scientists. The overarching aim of this course is for students to receive the underlying philosophies and tools necessary to become skilled scientific writers. The course includes the three components of effective communication: content, structure, and language.

First, we will analyze the key elements of good research articles, emphasizing the significance of the overall structure and exploring different strategies used to



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develop clear and interesting papers. Here we will highlight why an article must contain the subject of research, key knowledge gaps, compelling questions, clear descriptions of methods and results, and a well-organized discussion and conclusions. We will present different narrative techniques and analyze how we can use these to facilitate flow and continuity within and between sections. We will develop writing style at multiple organizational levels, from the broadest story arc, to the details of paragraph and sentence structure, to the nuance of particular word choices.

Each student will work individually to refine his or her short articles using the tools presented during the course. At each course meeting, students will work in small writing groups where they will analyze and provide constructive criticism on each other's papers. Students will also engage with the broader group in larger discussions, sharing the successes and challenges from the daily exercises and the analytical work during the previous week. Examples of additional topics covered during the course include: the importance of scientific writing for researchers; how to interest readers; how to formulate a research question; how to frame solid arguments; and how to generate titles and write concise and compelling abstracts. In addition, students will also read about and discuss the challenge of gender bias in scientific publishing. Finally, students will meet and be able to ask questions to a chief editor of a scientific journal.

4. Form of instruction

We will meet once a week for six weeks. Each meeting starts with a short lecture focused on scientific writing in practice, based on experience with journals, editors, etc. The optional readings will cover this part. We will then introduce the writing session and divide into small writing groups of three to four students. Before each session, students will have prepared a text, or revised their text according to a specific exercise. Other students within the writing group will have also commented on the new versions of their group members. Together, students will analyze, discuss, and revise the texts to improve them. Each of these weekly exercises derives from the 'Writing Science' book, which from chapter to chapter provides new tools to organize papers and improve writing skills. Each week we will cover three chapters and the corresponding exercises. We will also read and analyze published papers. At the end of each class period, we will reunite to summarize and conclude the day's activities and present the exercise for the next meeting. Finally, at the end of the course, the instructors will provide all students with individual feedback on his or her paper.

We use Cambro to coordinate all exercises.

Importantly, we provide the first chapter of Writing Science and announce the first exercise before the first meeting, so that students can prepare a rough draft of a short article (800-850 word limit).



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5. Examination modes

Active participation, including thorough feedback in writing groups.

In multiple exercises write, revise, and edit a short article to reach submission quality as an extended abstract.

Analysis and peer review of two published papers.

6. Other regulations

Academic credit transfers are always reviewed individually according to the University's set of rules and academic credit transfer regulations.

7. Literature

Main:

- Schimel J. (2012) *Writing Science: How to write papers that get cited and proposals that get funded*. New York, New York: Oxford University Press

Optional but recommended:

- Day R.A, Gastel B. (2012); *How to write and publish a scientific paper*. (7th edition) Cambridge, UK: Cambridge University Press
- Williams J.M. (2012) *Style: Lessons in Clarity and Grace*. (11th edition) Upper Saddle River, New Jersey: Pearson Education Inc
- Booth W., Gregory G.C., Williams J.M. (2008) *The Craft of Research* (3rd edition) Chicago, Illinois: The University of Chicago Press

Additional research articles will be distributed during the course