Module 5.3: Learn - Professional Development

5.3 Professional Development

For this module's professional development, we will focus on getting ideas together to write a paper (which you will be doing in the next module). We will talk about how to choose your main idea and how to present a logical flow of ideas to make that main conclusion. Formally, the communication of scientific results is accomplished in published research papers, posters, and oral presentations. We anticipate that you will be able to port these skills to any other scientific presentation you participate in.

We have started listing questions we can ask within the context of this study in the first section of this module. This week we will be deciding as a class how to divide those questions up and you will be presenting results answering those questions in your paper in the next module.

The writing process

Having read scientific papers, you might think that the best way to write your own results as a scientific paper is to write the required sections of a paper in order you would see them, but the best way to write papers is first to make a detailed outline of the conclusion you want make and the evidence you have for that conclusion. The figure below illustrates a practical and efficient workflow for the scientific writing process, with the arrows indicating places where you can rethink, edit, and fine tune. The main idea is that you want to think and decide on the conceptual level first and then sit down to write the sections and paragraphs.

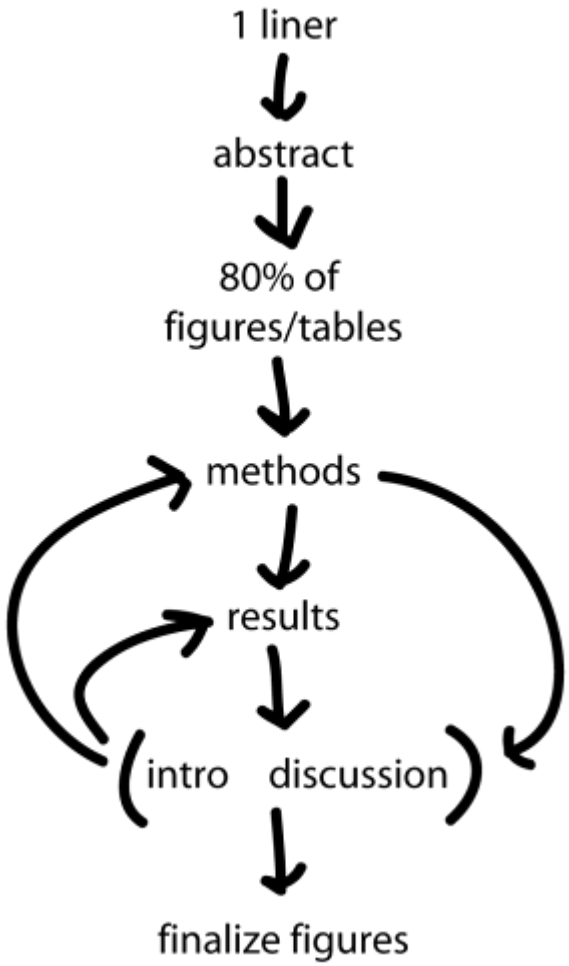

Figure: An effective workflow for the writing process for a scientific paper [Source: **How to write a bio paper (https://shirleywho.wordpress.com/2008/09/30/how-to-write-a-bioinformatics-research-paper/)**]

Start with a good outline

Making a good outline of the ideas you have in the paper can really help you to get your thoughts together. This quickly start this process. You will be asked to do a shortened version of what is done for a full paper, but it's gre train is headed and that you don't have to have to worry about the details at first.

How to Outline Your Scientific Research Paper (https://www.youtube.com/watch?v=MkgEg2U78go)

(https://www.youtube.com/watch?v=MkgEg2U78go)

How to Outline Your Scientific Research Paper transcript (https://docs.google.com/document/d/1oO1UNXfTENgZrYWccZuL8fyJsTXbnQrWl2bcM3gHWAc/edit?usp=sharing)

Choosing the main ideas

The starting place for your research paper will be the main results you are showcasing to address the subquestic this is the 1 liner and abstract phase of the writing process. The results you want to highlight clearly describe ne come from the experiments you have done. Remember that the goal of writing a research paper is not to chronic have done, but rather it is to demonstrate how you arrived at an important scientific conclusion.

Storyboarding your figures

Once you have thought about the main idea you are writing about, you must go through and select the figures yo illustrate your findings on that main idea. This includes the content of the figures, explaining what each aspect of (figure legends), which figures can be put together in a panel, and what is the most logical and convincing order t This is the “80% of figures/tables” part of the writing process and this part typically involves a lot of discussion an project lead, the PI, and collaborators so that everyone gets on the same page with the basis of the scientific pap

This video shows you how to create figures for scientific papers and posters, including how to put figures togethe

How to create a figure for a scientific paper or poster (https://www.youtube.com/watch?v=RZWdvjmtOpQ)

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How to create a figure for a scientific paper or poster transcript
(https://docs.google.com/document/d/1ADXSkQo1TO7kLjpTOD0r0238VLWFswR_XsTtEuKZDz4/edit?usp=sharing)

Go through the analysis you have done to see what figures address the question you were assigned. Think abou you might need to round out the story. Whichever ones you can make in the time you have for this course, add tl require more time or more data, keep note of those to go in the discussion section which will include follow-up qu directions.

Drafting an abstract

The abstract is a short summary of the research paper. While the final wording of the abstract will be developed writing process, starting to write a simple paragraph outlining the nature of the problem you are trying to solve an solve it can be a great way to get started with your scientific paper.

Here is a page giving a quick summary of how to write an abstract to help you get started:

Writing an abstract (https://www.clarion.edu/academics/student-success-center/writing-center/writing-an-abstra

Picking a journal to submit your paper

When you start your writing process, it's good to have an idea of which journals you would like to submit to so yo results to what those journals emphasize. There are many journals available for publishing results, but the aim is read by the scientists that are most likely to use it to further research.

Journals are chosen for submission based on:

1. Topic relevant to what you are studying

a. Cancer cell lines

- Example cancer journals: Cancer, Cancer Research, Cancer Cell

b. Sex chromosomes and sex differences:

- Example journals: Biology of Sex Differences

c. Gene expression and genomics:

- Example journals: Genomics, American Society of Human Genetics Journal, Genome Research, G Human Molecular Genetics

d. Novel techniques for genomics analysis (prediction of genetic sex from gene expression dat

- Example journals: Nucleic Acids Research, Bioinformatics, BMC Bioinformatics

2. Journals that published important previous work

a. Pubmed

- A Pubmed search shows that papers analyzing CCLE cell lines with different omics level technique metabolomics of the CCLE cell lines was published in Nature and Cell journals, just like the origina
- Nature, Science, and Cell are considered the top research journals, so they are very difficult to get in, so usually people try to publish there if their results turn out to be really cool

b. Google Scholar

- Using Google Scholar to look up papers about the “Cancer Cell Line Encyclopedia”, you can find a “Tumor Suppressors Status in Cancer Cell Line Encyclopedia” which is published in Molecular Onc also reporting a status of something in our work, maybe that would be a good journal

3. Impact factor: metric used to determine how many readers are reached

a. Best journals have impact factors > 10
b. Good journals are > 3
c. Obscure journals are lower or not assigned an impact factor)
d. **https://www.resurchify.com/if/impact-factor-search (https://www.resurchify.com/if/impact-factor-search)**
e. The higher the impact factor

- The wider the audience
- The more time and resources it will take to get your work published
- The more fame and glory you get if you publish there

We will likely submit this work to a journal about cancer research because cancer researchers are the ones most cancer cell lines models and thus learn something relevant to their work from ours.

Additional Resources

- Comprehensive discussion about how to storyboard research:
  - **Storyboarding research. How to do smarter, proactive… | by Writing For Research | Advice for autl academic book | Medium (https://medium.com/advice-and-help-in-authoring-a-phd-or-non-fiction/story-b430cebd5ccd)**
  - **Tip of the Week: Use PowerPoint to "storyboard" your paper: Su20: Writing for Academic Publicati (https://bcourses.berkeley.edu/courses/1492853/pages/tip-of-the-week-use-powerpoint-to-storyboard-your-pa**