

PHYS 590 Class Meeting: Final Deliverables

Alex Wright

February 28 & March 4, 2024

Final Reports

- Final reports are due at 5pm on March 28. Please email the report in PDF form to me and your advisor.
- Reports should be no more than 20 pages, including figures but not including bibliography and appendices.
- The style and formatting of the reports should be similar to the mid-year report: journal formatting in either the Physical Review or Astrophysical Journal style
 - See my slides from November for hints and suggestions

Final Report Draft

- Report drafts are due on March 14
 - Please submit a PDF by email to me and your advisor

Written Report Drafts (Midyear and Final)

Report drafts are due about two weeks before each of the major reports. These drafts, in pdf form, should be sent electronically to your supervisor and the course coordinator for comment/feedback. The drafts are meant to be an opportunity for us to provide you with constructive feedback, so the more complete the draft the more useful our feedback can be. The drafts should include at a minimum a properly formatted skeleton of the paper with section headings, an image, and a point form outline of what you plan to say in each section – this will help you get started with your thinking about the draft contents and ensure you have the formatting tools in place. This is intended to be helpful, and will be graded as either 0 or 1/1. Should you receive 0, the mark will be dropped and the weighting assigned to this component in your overall mark will be added to the corresponding written report.

This really is meant to help you!

Final Report Grading

- The grading of the final report will be done similarly to the midyear report, but with less emphasis on specific style elements and more emphasis on your research accomplishments
- Be sure that your report highlights your understanding of the project at all levels, and clearly spells out your personal contributions and accomplishments
 - “a significant innovation in the present work was....”
 - “existing models were extended in the following key ways....”
 - “key new findings of the current work include....”
- Research doesn’t always “turn out” like it was supposed to. If your project hit a snag and you didn’t get the result you were hoping for, it is still important describe what you did as thoroughly as you can.
 - The structure of the paper can be more-or-less the same, but with the results/conclusion describing the unexpected result and the reason(s) you think they may have occurred.
 - It is important that you help the reviewers to understand that the approach you took was well thought out and well executed, and the unexpected result was because of unexpected physics – not because you didn’t think about or execute things carefully
 - Reviewers are told that the majority of the credit can be awarded to good projects that “just didn’t work” – but projects that didn’t work for preventable reasons should receive a lower score.

Poster Session

- The poster session will be:
 - Wednesday, April 10
 - On Stirling 3rd floor foyer & environs.
 - In conjunction with the poster session for ENPH 455
- There will hopefully be an “open house” for the Department, with food provided – I will send a schedule once details are finalized
- For the evaluation, you will be visited by your two examiners separately
 - I will provide you with your schedule in advance
 - Each examiner will typically be at your poster for 20 minutes or so.
 - I will try to group your examinations together so that you don't have to be there all day.

Poster Printing

- Posters should be 3' x 4' (be sure to set the size correctly in your layout software).
- Poster printing can be done “for free” in the chemistry department.
 - The Department will cover the cost of printing one poster for each of you – reprints are at your expense!
 - Posters must be submitted for printing by 9:00 am on Friday April 5th. No revisions are possible after submitting - see the submission instruction sheet posted on the course web site.
- Printing can also be done commercially (P&CC, etc) at your expense (possible closer to the deadline!)

Poster Presentation

- You will probably be asked by the examiners to introduce your poster, so I recommend preparing and practicing a 5-10 minute talk. You should be prepared to be interrupted/sidetracked with questions, and that is OK – it is often best if the meeting turns into a discussion.
- The poster + presentation should aim to convey essentially the same information as your report
 - Give the context of your project, describe what you did, and highlight your personal contributions and results
 - The poster necessarily includes a “higher level” view than the detailed report

Poster Tips

- A poster should capture and convey the key points of your project in a clear and visually appealing way
- The amount of content that you can fit on a poster and still have it intelligible is quite limited
 - Some suggest 500-800 word maximum
 - Think carefully about what to include (what information/figures/etc do you need to have at hand to explain your project to someone, and what things are “extras” that you can add in discussions)
- Aim to have the ‘key points’ legible from 2-3m away
 - I suggest printing “test fonts” and trying them

Title, formatted in sentence case (Not Title Case and NOT ALL CAPS), that hints at an interesting issue and/or methodology, doesn't spill onto a third line (ideally), and isn't hot pink

Colin Purrington
666 Teipai Street, Posterville, PA 19801, USA

Introduction

Congratulations, a reader was mildly intrigued by your title. Now you have 2-3 sentences to hook him/her into reading more by describing what your question was and why the answer might be of general interest. Grab some background information will cause them to walk away (if you're standing next to your poster, that can be awkward).

Typography research has shown that body text is easier to read if you use a serif font such as Times. But scientific fonts are great for titles, headings, figure legends, etc. Research also shows that really justified text (the typography is slightly harder to read even though it looks really good).




Figure 1. A photograph in your introduction can help you guide to your otherwise non-photogenic research. If it's your image, ask photographer for permission to use, and the title/author.

Results

The overall layout in this section should be visually compelling, with clear cues on how a reader should travel through the components. Be creative. You might want a large map with inset graphs, or have questions on left with answers and supporting graphs on right. Be sure to separate figures from other figures by generous use of white space. When figures are too cramped, viewers get confused about which figures to read first and which legend goes with which figure.

If you can add small drawings or icons to your figures, those visual cues can be particularly aids in assisting viewers. And use colored arrows or callouts to focus attention on important parts of graphs. You can even put text annotations next to arrows to tell reader what's going on that's interesting in relation to the how the hypothesis is being evaluated. E.g., "This outlier was most likely caused by contamination when I rechecked this tube." Also, don't be afraid of using colored connector lines to show how one part of a figure relates to another figure. These tips might induce gaps for published manuscripts, but posters can be more personal and the better guide viewers.

Figures are preferred but tables are sometimes unavoidable, like death. But go to great efforts to make it look professional. Look in a respected journal and emulate the layout, line types, line thickness, text alignment, etc., exactly. Align, use colored text or arrows to draw attention to important parts of the table.

Paragraph format is fine, but so are bulleted lists of results:

- 9 out of 12 biostatisticians not surprised
- Biostatistical rate are low
- Control rates completed more faster, on average, than rats without brains

Materials and methods

Few people, if any, really want to know the granular details of what you've been up to, so be brief. Use slightly-annotated photographs, diagrams, or flow charts. To better engage viewers in your protocol or system, try attaching actual objects such as study organisms (dead specimens), research gowns, phone flip books, or a short movie (attach would interchange with video).



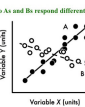


Figure 2. Hire an artist to illustrate the treatment steps in your protocol. A photograph of you actually doing something might be nice, too. [Image by John Snow 1853]

Figure 3. Legends can briefly describe the experiment, answer the question, and even include statistics if you so choose (ask a manuscript figure legend).



Do As and Bs respond differently to X?



Are means of treatment A and B different?




Figure 4. Label elements instead of relying on annoying keys that are default in most software. Add pictures of A and B if they are actually things (e.g., corn of rat with/without brain).

Figure 5. Don't be tempted to reduce font size in figure legends, axes labels, etc. This is because viewers are probably most interested in viewing your figures and legends.

Conclusions

Conclusions should not be dry statements of your results. You want to guide the reader through what you have concluded from results, and you need to state why those conclusions are interesting (i.e., don't assume reader will guess). These first several sentences should refer back to the burning issue mentioned in the introduction. If you didn't mention a burning issue in the introduction, fix that.

A good conclusion will also explain how your conclusions fit into the literature on the topic. E.g., how exactly does your research add to what is already published on the topic? It's important to be humble and generous in this section, partly because authors of previous literature may still be alive and even attending the conference. You can also display your appreciation of others' input by citing conversations you have had (with past commas).

Finally, you want to tell readers who have heard this long what might be done next and who should do it. E.g., are you currently taking the next logical step, or should another person with different skills follow up your amazing result? It's OK to put a bit of personality into this ending because viewers expect posters to be personal (and if you're not actually standing there to convey your enthusiasm, your poster text should be doing the job).

If you have a graphical way to express the next step of your hypothesis, by all means include it in this section. For example, you might make a graph with hypothetical data that shows an expected result in a future experiment. That's something you normally don't show in a traditional manuscript, but it's usually fine for a poster.

If you're curious, this poster has 683 words. Aim for 500 words. If you are above 1000 words, your poster will be annoyingly long to anyone except your collaborators.

A well-designed poster remains plenty of white space separating edges of text boxes, graphics, and tables. You also want space between your text and edge of box. Without white space a poster will look cramped and uninviting.

Literature cited

Scott, E.C. 2005. *Evolution vs. Creationism: an Introduction*. University of California Press, Berkeley.

Bondie, D.J., E.M. Boyce, and R.M. Brigham. 1996. Lamer condition influences coyote (*Canis latrans*) breeding. *American Midland Naturalist* 138:1-11.

Brooks, L.D. 1988. The evolution of vaccination rates. Pages 87-105 in *The Evolution of Sex*, edited by R.E. Michod and R.R. Levin. Sinauer, Sunderland, MA.

Scott, E.C. 2005. *Evolution vs. Creationism: an Introduction*. University of California Press, Berkeley.

Society for the Study of Evolution. 2005. Statement on teaching evolution. <http://www.evolution-society.org/positions.html>. Accessed 2005 Aug 9.

Acknowledgments

We thank J. Gibor for laboratory assistance, Mary Hana for snacks, and Chuck Biele for greenhouse care. Funding for this project was provided by the Department of Zoology. Note that people's titles are omitted (this is TMI).

Further information

More tips (and templates) can be found at "Designing conference posters".

<http://colinpurrington.com/tips/poster-design>

Image from colinpurrington.com/tips/poster-design

Poster Tips

- One of the biggest challenges is preventing your poster from appearing “cluttered”
 - Formatting/layout, limiting text, and careful use of figures is key
 - Thinking about fonts, font sizes, colour schemes, etc, can have a big impact in making your poster visually appealing and easy to follow
- Look at examples online to see what style ‘works’ for you!

Tips for Designing Effective Presentations
A poster with the main title in 1½" sans serif
 Developed by D. Stong, C. Dwyer, W. Kolty, B. Immel, and K. Winck
 with materials donated by Penn State's Education Technology Services



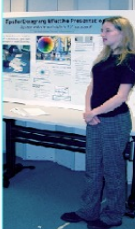
<p>Get the audience's attention and communicate your message quickly and succinctly.</p>  <p>Caption your images clearly. This is a photo of the design team organizing content, deciding what to eliminate, what to keep, and how to arrange it.</p>	 <p>Choosing and Using Color</p> <p>Maximize a color scheme. Keep backgrounds white, grays and neutral colors help foreground information stand out. Use bright, saturated colors sparingly. Large amounts of red, yellow, or orange can overpower your message.</p>	<p>Using Images</p> <p>Use meaningful, high-quality images. Adjust color and contrast to images. Crop or edit images to the important information in photos. Give photos above titles or captions. Label directly on maps, charts, and graphs. Use bold lines to graph on the data can be seen and understood from 3 feet away. These images on that figure followed readily in the poster and our help to lead the viewer's eye through the materials.</p> <p>Judges Checklist</p> <p>Remember, the following should be clearly presented and readable from a distance of 4 to 6 feet.</p> <ol style="list-style-type: none"> 1. Title of the exhibit 2. Exhibit's name 3. Classification, edition, and department 4. Funding sources 5. Regulatory committee approval (if the project involves human or animal subjects or biohazardous materials) 6. Objectives 7. Significance to the field 8. Significance to society in general 9. Methods 10. Results 11. Directions for future research
<p>Developing a Layout</p> <p>The most important things to do first: Use a grid to keep items aligned and straight. Use a line separator. Try to keep 60% of the poster area empty of text and images. Limit your use of boxes and lines. If items go together, put them close to each other.</p> <p>Planning</p> <p>Keep it simple. Develop an information hierarchy. Think visually.</p>	<p>Selecting Fonts and Using Text</p> <p>The maximum word count for body text: Use one serif font for titles. Try to use no more than three fonts. Combine bold, uppercase and lowercase letters. Use large fonts that can be easily read from 3 feet away. Black text on white has high impact and excellent readability.</p>	 <p>Viewers reading this line demonstrate the poster's success!</p>

Image from personal.psu.edu/drs18/postershow/

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MD Anderson Cancer Center Orlando
 A Division of The University of Texas Health System

O⁶-Benzylguanine Inhibits Tamoxifen Resistant Breast Cancer Cell Growth and Resensitizes Breast Cancer Cells to Anti-Estrogen Therapy

Abstract
 Estrogen therapy using endocrine agonists has been used as first-line therapy for breast cancer. However, tumor resistance to tamoxifen remains a significant barrier to successful therapy. Based on our recent work on the involvement of the DNA repair protein MGMT in tamoxifen resistance, we have developed a novel MGMT inhibitor, O⁶-benzylguanine (OBG), which is a potent MGMT inhibitor. In this study, we investigated whether OBG could resensitize tamoxifen resistant breast cancer cells to anti-estrogen therapy. We found that OBG treatment significantly inhibited the growth of tamoxifen resistant breast cancer cells in vitro and in vivo. Furthermore, OBG treatment significantly increased the sensitivity of tamoxifen resistant breast cancer cells to anti-estrogen therapy. These findings suggest that MGMT inhibition may provide a novel and effective approach for breast cancer treatment.

Introduction
 Breast cancer is the leading cause of cancer death among women in the United States. Estrogen therapy is the mainstay of treatment for breast cancer. However, tumor resistance to tamoxifen remains a significant barrier to successful therapy. Based on our recent work on the involvement of the DNA repair protein MGMT in tamoxifen resistance, we have developed a novel MGMT inhibitor, O⁶-benzylguanine (OBG), which is a potent MGMT inhibitor. In this study, we investigated whether OBG could resensitize tamoxifen resistant breast cancer cells to anti-estrogen therapy. We found that OBG treatment significantly inhibited the growth of tamoxifen resistant breast cancer cells in vitro and in vivo. Furthermore, OBG treatment significantly increased the sensitivity of tamoxifen resistant breast cancer cells to anti-estrogen therapy. These findings suggest that MGMT inhibition may provide a novel and effective approach for breast cancer treatment.

Results
 Prolonged treatment of tamoxifen resistant breast cancer cells with OBG significantly inhibited cell growth. We found that OBG treatment significantly inhibited the growth of tamoxifen resistant breast cancer cells in vitro and in vivo. Furthermore, OBG treatment significantly increased the sensitivity of tamoxifen resistant breast cancer cells to anti-estrogen therapy. These findings suggest that MGMT inhibition may provide a novel and effective approach for breast cancer treatment.

Conclusions
 OBG treatment significantly inhibited the growth of tamoxifen resistant breast cancer cells in vitro and in vivo. Furthermore, OBG treatment significantly increased the sensitivity of tamoxifen resistant breast cancer cells to anti-estrogen therapy. These findings suggest that MGMT inhibition may provide a novel and effective approach for breast cancer treatment.

Acknowledgements
 We thank Dr. [Name] for providing the tamoxifen resistant breast cancer cell lines. This work was supported by [Funding Source].

Image from betterposters.blogspot.ca

Some online resources for poster making:

- <https://colinpurrington.com/tips/poster-design> This extensive site includes poster templates
- <http://betterposters.blogspot.ca> Yes, there really is a whole blog about making posters (look back at older posts, though, as it has recently become quite commercial)....
- <https://guides.nyu.edu/posters>