Some Tips for Designing and Presenting an Effective Research Poster

• Understand your target audience. Does your poster aim to present your work only to people in your field, or does it need to reach a broader audience? If the latter, make sure that your poster can be understood by a non-specialist and that the possible implications of your work for policy, practice, or future research are clear.

• Less is more. Don’t overwhelm your viewer with too much text or with confusing visual information. Your poster should be simple, easy to navigate, and aesthetically pleasing. Highlight your research questions and your main findings, some exciting anomalies, or trends that you’ve found in your research.

• Make your argument easy to follow. Include titles for each section. Use visual information (charts, data tables, equations, diagrams, images) as evidence. Show how the evidence supports or relates to your larger argument. Label your figures clearly. Typically your poster will have three or more columns and read top to bottom, left to right.

• A poster session combines visual, textual, and oral arguments. A poster should be easily readable on its own but its larger purpose is to prompt and enable a conversation about your work.

• Practice and prepare for a poster session. Anticipate the questions a viewer might ask about the research represented by your poster, and imagine how you might respond. With a classmate or a Writing Center tutor, practice responding to questions about your poster. Aim for an informative conversation, not a mini-lecture.

• When someone asks a question about your research, make sure you understand the question. Do you need to ask the person to clarify the question or provide additional information?

• Assess whether you can answer the question. If you don’t know the answer, say so. A difficult question may help you to further clarify and refine your research. You can thank your interlocutor for a good question and say that you’ll think further about it. If information not provided on your poster might help answer the question, you can offer to correspond later with the questioner.
Legendrian Knots
A new approach to calculating non-classical invariants
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Abstract
One of the main goals in knot theory is to determine when two knots are isotopic. We focus on Legendrian knots, which lie in the standard contact structure, and invariants which distinguish them. Traditionally, computing these invariants has been infeasible for large knots, but we have found and implemented a more direct approach which makes computing on higher crossing knots more practical. Using this we determined the cup product for n-linked unknots, and found interesting patterns in the non-commutative products of knots.

Introduction
Knots are embeddings of a circle into $\mathbb{R}^3$. We say two knots are equivalent if one can be deformed into the other without cutting the knot at any point.

Figure 1: Two projections of the unknot

There is no general method of distinguishing knots, however there are invariants of knots which stay the same no matter how much you tangle the knot up.

Figure 2: The trefoil and unknot are distinguished by the 3 coloring invariant

Our research focuses on Legendrian knots, which are knots which lie in a contact structure. When we look at a front projection of Legendrian Knots, the knot will have no vertical tangents.

Figure 3: A legendrian unknot (left) and figure-eight knot (right)

Main Objectives
Our main objective was to write a program to calculate a series of invariants of Legendrian knots, each of which are built upon the previous invariants.

1. Calculate all rulings of a knot, and the associated ruling polynomial

Figure 4: Two rulings on a trefoil, with switches marked

2. For each ruling find the associated augmentations

Figure 5: Switch return forms (left) and the associated s forms (right)

3. Calculate the linearized contact homology of the knot
4. Calculate the cup products of the contact homology
5. Examine non-commutative products of knots for underlying patterns

Results
For n-copies of the unknot we found that the product followed a simple pattern. If we label each column of crossings from left to right, splitting at the center, we see that each successive column has 1 less non-commutative product. We also note there is a pattern in the non-commutative products.

Figure 6: 3-copy of the unknot, with the cup product

Figure 7: n-copy of the unknot

We also calculated the double product for all 10 crossing knots.

Conclusions
Our new program to compute linearized homologies and double products is significantly faster than the old methods on higher crossing knots. This allows us to examine more knots and at higher crossings for interesting properties. One such property found is that in all cases we have examined the non-commutative products of knots form loops such as $ab, ba, cd, da$.

Forthcoming Research
With this program we can now examine higher order knots to see if the pattern in non-commutative products still holds and further probe the products. We can also examine what happens when we take n-copies of knots other than the unknot, possibly adding twists between the crossings.

Acknowledgements
We thank Josh Sabloff for being an insightful mentor, and Haverford College for providing funding for the research.
Abstract (44 pt font)

Your abstract should summarize your research, present your thesis and findings, and provide a roadmap through your poster. The abstract is meant to be a condensed version of your poster (to be quickly read by those who don’t have enough time to read your entire poster). Keep the abstract short, sweet, and to the point! Font may range from 25-36 pt font (this font is 36 pt font)

Introduction

The introduction contextualizes your research, summarizes previous research, positions your research within the larger picture, and provides background information necessary to understand your research.

Use charts!

Charts are fun!

Format data in tables!

<table>
<thead>
<tr>
<th>Year</th>
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<tr>
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<td>5</td>
</tr>
</tbody>
</table>

Make sure to explain your tables too!
- Don’t be afraid to use bullet points
- Bullet points make things easier to read and navigate
- Column labels are about 40 pt font

Use Pictures!

Keep Calm
It’s Only An Oral Presentation

Conclusions

Conclude your research. Speak about larger implications of your research, suggestions for further research directions to take...etc!

Acknowledgements

Acknowledge any collaborators, research institutions, and sources of funding that helped you with your research.

References

Make sure to cite your sources in the appropriate format!