



Student Committee On Research Education (SCORE): How to display your original research?

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Objectives

- Learn how to **effectively** deliver a poster presentation.
- Determine the elements in a poster to show, *not tell*, your research story in graphical terms.
- Display the essential content to deliver the message, by being bold, explicit and concise.
- Review the ethical and professional behavior when presenting a poster.

General Uses of a Poster

- Use it as a means to deliver your research story and generate active discussion.
 - Educate about your findings while getting feedback and critique prior submitting a manuscript.
- Immediate impact, as you disseminate your findings quickly in comparison to manuscript publication in a peer-reviewed journal.
- Promote one's work in a one-to-one fashion.
 - **Network!**
- Intellectual Challenge and an opportunity for personal growth.
- Enhance your *Curriculum Vitae*.

Things to consider before starting your poster

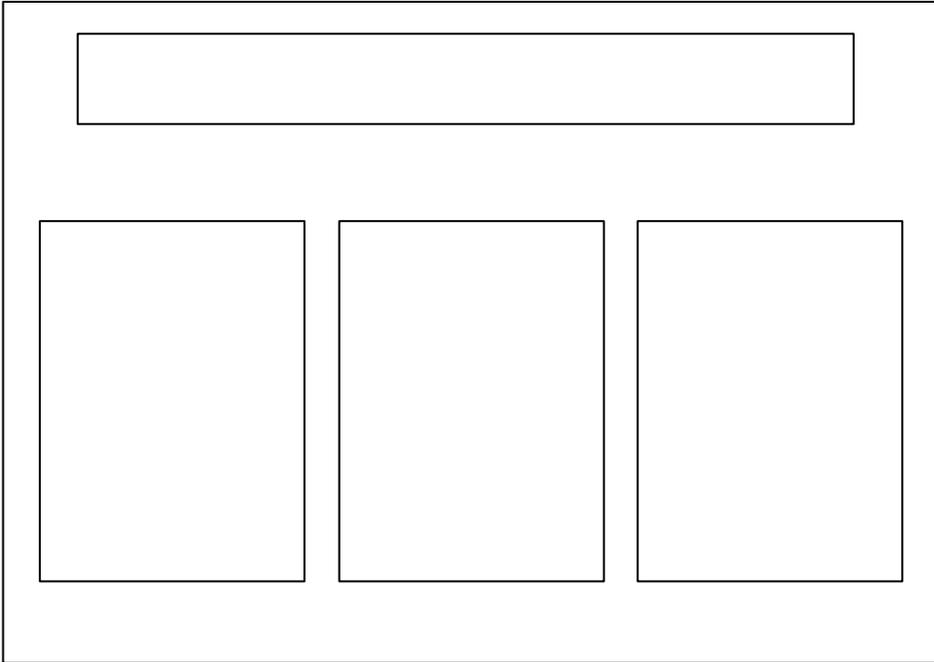
- Outline the content and keep in mind: What is the main purpose of this poster presentation? Who is your audience?
- What were the main issues with the research?
 - Did the results are in accordance to your hypothesis?
- What is the main conclusion I want the viewer to remember? Can I disclose all information? Am I ready to publish my work?
- Things to remember: You have 10 seconds to grab the audience attention and 3-5 minutes to convince them of your work.

Audience

- Groups:
 - People who know a lot about your specific work.
 - People within your field, but not in your area of expertise.
 - Usually, these are your target in a conference.
 - People outside of your field.

Layout Examples

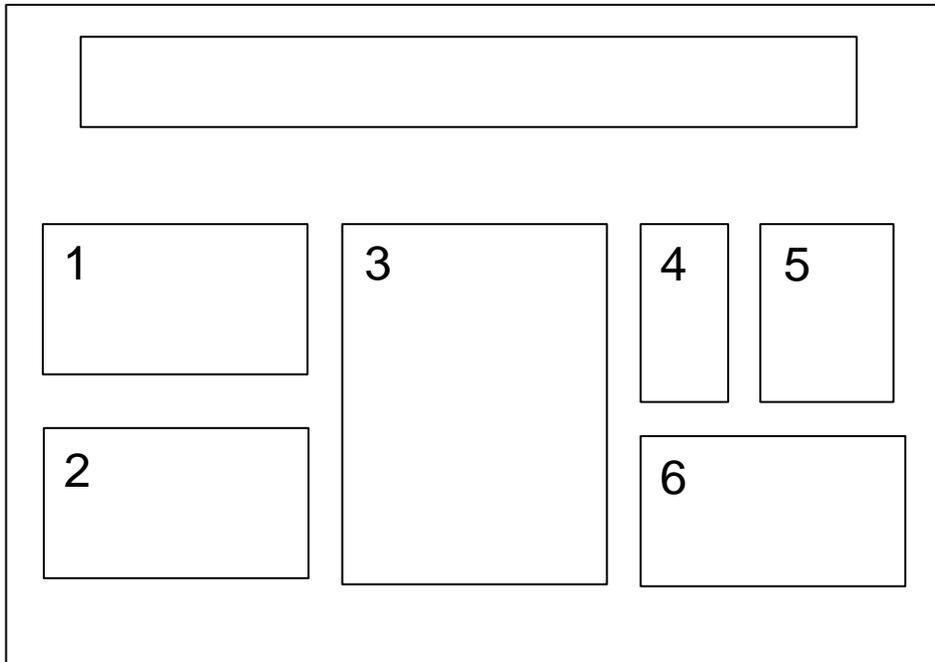
Column Layout



- Before you start it, make sure you know the dimensions of your poster.
- Open layout into three columns.
- Allows easy flow of people when reading your poster.
- Allows interactions among viewers.
- Obvious to viewers how to progressively view the poster.

Layout Examples

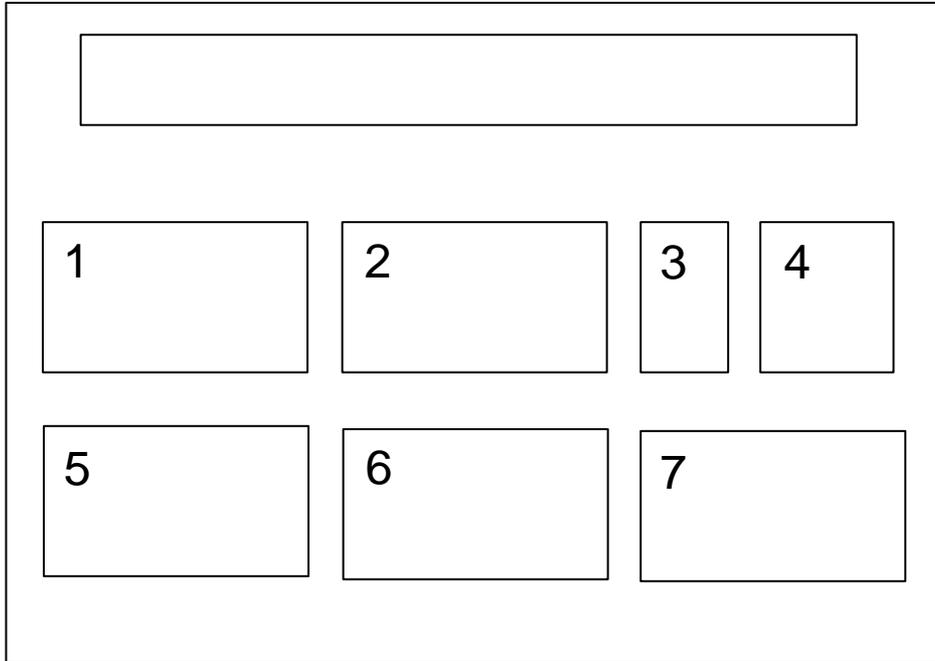
Open Space Layout



- Easy to follow by using numbers (you may also use arrows →).
 - Standard system
- It is not required to use all the space, sometimes less is more.
- **Do not place individual slides on poster board.**
- Use logical structure that guides the reader along the main points.

Layout Examples

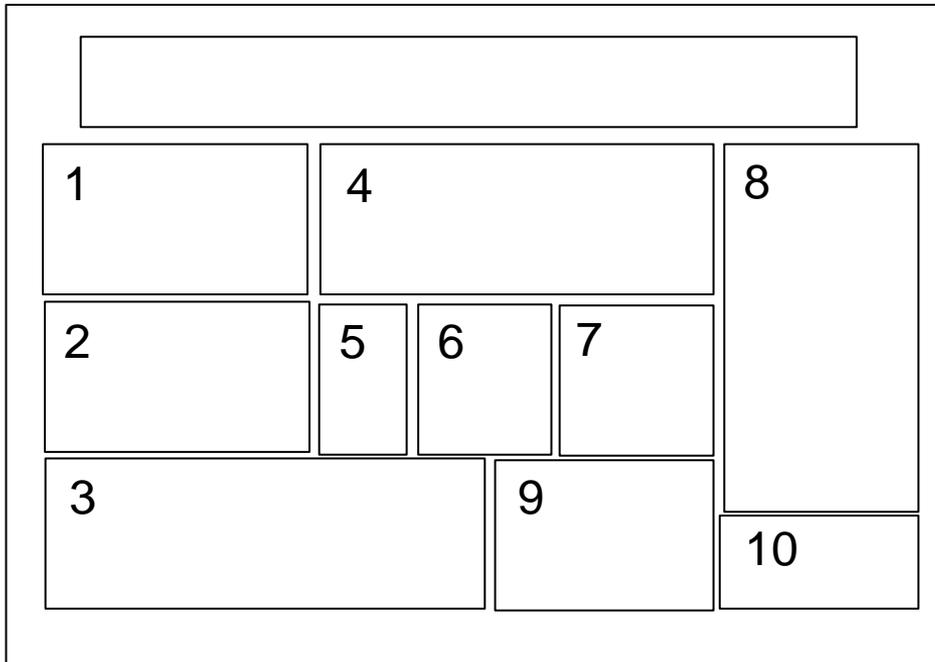
Halves view Layout



- Not easy to follow as people may have to go from left to right and then back to the left.
- Discussions will be interrupted by people trying to read your poster.
- Although visually “clean”, not the best layout, still not the worst.

Layout Examples

Maximize Space Layout



- **Not pleasing to the eye.** Looks cluttered.
- Poster should be concise and easy to understand in the absence of the author.
- Viewer will be tired and lose interest no matter how good the research is.
- How many messages are you sending out?
 - **Overwhelming** to the viewers.

Lettering and Visuals

- Text should be readable from five feet away.
 - Fonts: **Arial, Helvetica, Times New Roman.**
 - Font Size: Minimum 18 points, except for figure legends which can go down to 14 points.
 - Stay away from *calligraphy*.
- Present numerical data in graphs. If you rather use tables, keep them simple!
 - Make sure all graphs axes are labeled and symbols are explained.
 - Graphics should be relevant and not distracting.
- Ensure any image used are not bound by copyright!

Lettering and Visuals

- Use color to enhance, not to decorate.
 - Avoid **red** and **green** combinations. Red/ Green color blindness is the most common: ~10% males, ~5% females.
- Have a complementing choice of colors. Take in consideration background color when presenting color images.
- Less is more... Example: Best if you use no more than 20 items in a Table.
- If you have the logo of your institution, place it in the top right or top left corner.



PIGS IN SPACE: EFFECT OF ZERO GRAVITY AND AD LIBITUM FEEDING ON WEIGHT GAIN IN CAVIA PORCELLUS



SPACE-EXES

Colin B. Purrington

6673 College Avenue, Swarthmore, PA 19081 USA

ABSTRACT:

One ignored benefit of space travel is a potential elimination of obesity, a chronic problem for a growing majority in many parts of the world. In theory, when an individual is in a condition of zero gravity, weight is eliminated. Indeed, in space one could conceivably follow ad libitum feeding and never even gain an gram, and the only side effect would be the need to upgrade one's stretchy pants ("exercise pants"). But because many diet schemes start as very good theories only to be found to be rather harmful, we tested our predictions with a long-term experiment in a colony of Guinea pigs (*Cavia porcellus*) maintained on the International Space Station. Individuals were housed separately and given unlimited amounts of high-calorie food pellets. Fresh fruits and vegetables were not available in space so were not offered. Every 30 days, each Guinea pig was weighed. After 5 years, we found that individuals, on average, weighed nothing. In addition to weighing nothing, no weight appeared to be gained over the duration of the protocol. If space continues to be gravity-free, and we believe that assumption is sound, we believe that sending the overweight — and those at risk for overweight — to space would be a lasting cure.

INTRODUCTION:

The current obesity epidemic started in the early 1960s with the invention and proliferation of elastane and related stretchy fibers, which released wearers from the rigid constraints of clothes and permitted monthly weight gain without the need to buy new outfits. Indeed, exercise today for hundreds of million people involve only the act of wearing stretchy pants in public, presumably because the constrictive pressure forces fat molecules to adopt a more compact tertiary structure (Xavier 1965).

Luckily, at the same time that fabrics became stretchy, the race to the moon between the United States and Russia yielded a useful fact: gravity in outer space is minimal to nonexistent. When gravity is zero, objects cease to have weight. Indeed, early astronauts and cosmonauts had to secure themselves to their ships with seat belts and sticky boots. The potential application to weight loss was noted immediately, but at the time travel to space was prohibitively expensive and thus the issue was not seriously pursued. Now, however, multiple companies are developing cheap extra-orbital travel options for normal consumers, and potential travelers are also creating news ways to pay for products and services that they cannot actually afford. Together, these factors open the possibility that moving to space could cure overweight syndrome quickly and permanently for a large number of humans.

We studied this potential by following weight gain in Guinea pigs, known on Earth as fond of ad libitum feeding. Guinea pigs were long envisioned to be the "Guinea pigs" of space research, too, so they seemed like the obvious choice. Studies on humans are of course desirable, but we feel this current study will be critical in acquiring the attention of granting agencies.

MATERIALS AND METHODS:

One hundred male and one hundred female Guinea pigs (*Cavia porcellus*) were transported to the International Space Laboratory in 2010. Each pig was housed separately and deprived of exercise wheels and fresh fruits and vegetables for 48 months. Each month, pigs were individually weighed by duct-taping them to an electronic balance sensitive to 0.0001 grams. Back on Earth, an identical cohort was similarly maintained and weighed. Data was analyzed by statistics.

RESULTS:

Mean weight of pigs in space was 0.0000 +/- 0.0002 g. Some individuals weighed less than zero, some more, but these variations were due to reaction to the duct tape, we believe, which caused them to be alarmed push briefly against the force plate in the balance. Individuals on the Earth, the control cohort, gained about 240 g/month ($p = 0.0002$). Males and females gained a similar amount of weight on Earth (no main effect of sex), and size at any point during the study was related to starting size (which was used as a covariate in the ANCOVA). Both Earth and space pigs developed substantial dewlaps (double chins) and were lethargic at the conclusion of the study.

CONCLUSIONS:

Our view that weight and weight gain would be zero in space was confirmed. Although we have not replicated this experiment on larger animals or primates, we are confident that our result would be mirrored in other model organisms. We are currently in the process of obtaining necessary human trial permissions, and should have our planned experiment initiated within 80 years, pending expedited review by local and Federal IRBs.

ACKNOWLEDGEMENTS:

I am grateful for generous support from the National Research Foundation, Black Hole Diet Plans, and the High Fructose Sugar Association. Transport flights were funded by SPACE-EXES, the consortium of wives divorced from insanely wealthy space-flight startups. I am also grateful for comments on early drafts by Mañana Athletic Club, Corpus Christi, USA. Finally, sincere thanks to the Cuy Foundation for generously donating animal care after the conclusion of the study.

LITERATURE CITED:

- NASA. 1982. Project STS-XX: Guinea Pigs. Leaked internal memo.
- Sekulić, S.R., D. D. Lukač, and N. M. Naumović. 2005. The Fetus Cannot Exercise Like An Astronaut: Gravity Loading Is Necessary For The Physiological Development During Second Half Of Pregnancy. *Medical Hypotheses*. 64:221-228
- Xavier, M. 1965. Elastane Purchases Accelerate Weight Gain In Case-control Study. *Journal of Obesity*. 2:23-40.



We predict functional interactions genome-wide in any organism using all available experimental results from multiple model systems. We thus link uncharacterized genes to pathways.



Functional understanding of microbial communities using experimental data integration



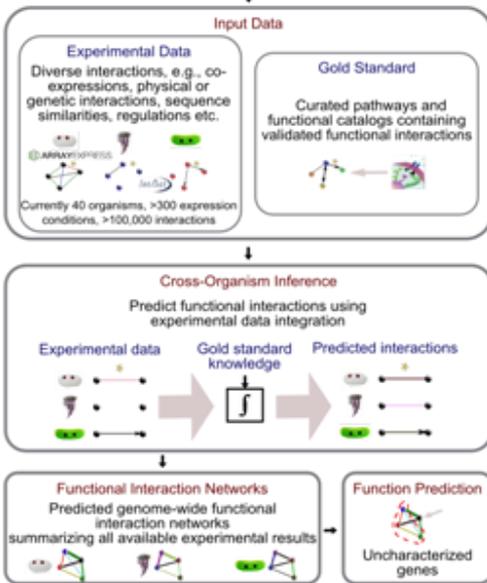
Pinaki Sarder¹, Nicola Segata¹, Dirk Gevers²,³ Department of Biostatistics, Harvard School of Public Health
 Jacques Izard¹, Curtis Huttenhower¹ ²Broad Institute ³Forsyth Institute

Taxonomic Functional Transfer: TaFTan

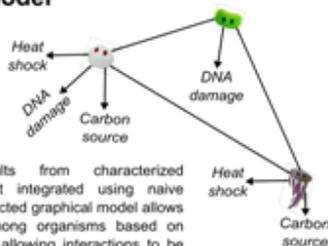


To understand the functional and metabolic activities of microbes and microbial communities, it is critical to link genes and proteins to their biological roles. This encompasses both their biochemical activities and the processes and pathways in which they are used by the cell. This problem is typically approached by transferring knowledge to newly sequenced genomes by relying on sequence similarity. This can be a difficult process involving sparse knowledge and the propagation of error, and even the best-studied organisms' genomes are only partially characterized. To mitigate these issues, we have developed a data integration method leveraging all experimental results available from multiple model systems to identify potential functional roles for genes in a new organism.

Overview



Graphical Model



Experimental results from characterized organisms are first integrated using naive classifiers. An undirected graphical model allows information flow among organisms based on functional similarity, allowing interactions to be inferred in target organisms with little or no available experimental information of their own.

Methodology

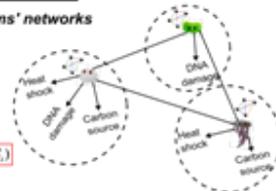
Map organism-specific gene identifiers to KO families

Taxon specific gene identifier	KO identifier
B3456	K01998
B3457	K01997

KO: KEGG Orthology
 Gene families with putatively conserved functions among multiple organisms

Learn individual organisms' networks

Predict individual organisms' networks from their own datasets and from KEGG using naive Bayesian classifiers.



$$P(S_i | D_i) \propto P(D_i | S_i) P(S_i)$$

Compute joint distributions between organisms

Compute pair-wise joint probability distributions between organisms using information from KEGG. These distributions quantify how functionally similar the organisms are.

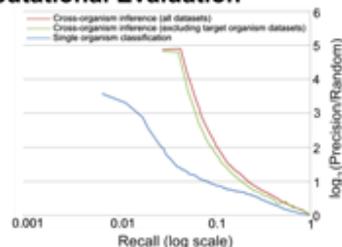
Update individual organisms' networks integrating all available datasets

$$P(S_i | D_i) \propto P(D_i | S_i) P(S_i)$$

$$P(D_i | S_i) \approx P(D_i | S_i) \prod_{j \neq i} P(D_j | S_j)$$

$$P(D_j | S_j) = \sum_{S_j} P(D_j | S_j) P(S_j | S_i)$$

Computational Evaluation

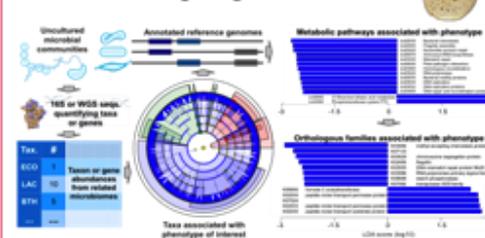


Average accuracy in recapitulating held-out interactions from a KEGG-based gold standard using experimental data from six model organisms (*B. subtilis*, *E. Coli*, *H. Pylori*, *M. tuberculosis*, *P. aeruginosa*, and *V. Cholerae*)

Biological Evidence

Many specific biological predictions are made by the system. For example, in *E. coli*, we infer a high-confidence association of *chbG* with the phosphotransferase system. This is an uncharacterized hypothetical protein with no functional annotation in KEGG or the Gene Ontology. However, literature evidence from Plumbridge et al 2004 confirms the participation of this gene in chitobiose uptake through the phosphotransferase system.

Additional Ongoing Work: LEfSe



Computational Tools:

The Sleipnir Library

The Sleipnir library for computational functional genomics provides a computational platform for rapidly analyzing and integrating very large collections of biological data.



<http://huttenhower.sph.harvard.edu>

Scientific Posters

Clinical

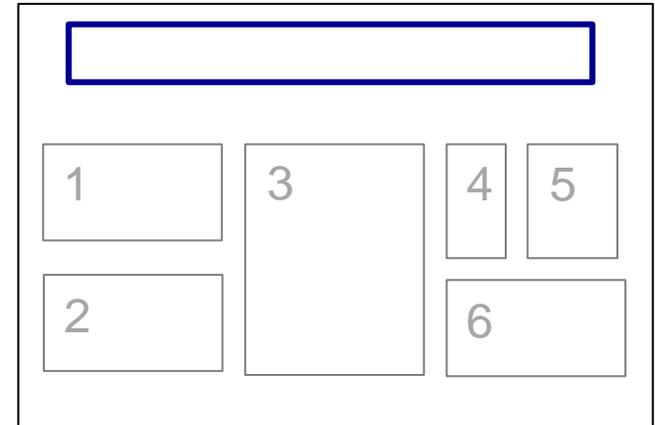
- Main components:
 - Headings
 - Introduction
 - Case Description
 - Discussion
 - Acknowledgements

Basic/ Translational

- Main components:
 - Headings
 - Abstract/ Introduction
 - Methodology
 - Results
 - Discussion/ Implications
 - Acknowledgements

Sections of the Poster

- **Heading**
 - Title of the poster
 - Use font size 70 or larger.
 - Authors
 - Title, Department and Institution



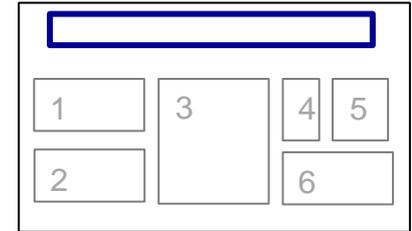
- Examples:

Defective Cytokine Secretion in the absence of actin remodeling in
CD4⁺ T Cells

Cytokine Release in T Cells

Sections of the Poster

- Examples:



Defective Cytokine Secretion in the absence of actin remodeling in CD4⁺ T Cells

First Author, M.S., Ph.D., Second Author, B.S., Senior Author, D. Phil.
Center/ Institute, Department, University Name, City, State, Country

Scientific Posters

Clinical

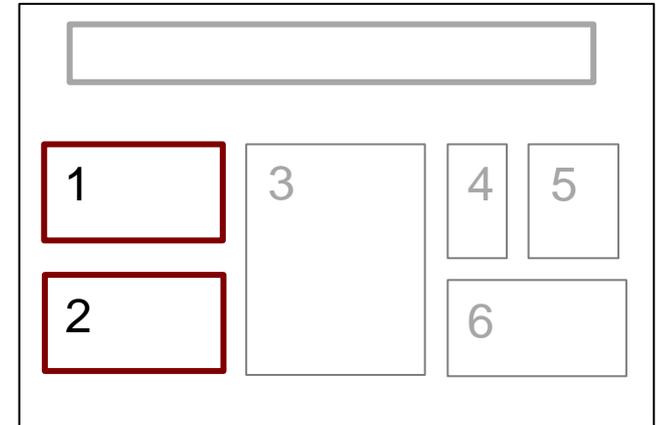
- Main components:
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Basic/ Translational

- Main components:
 - Headings
 - Abstract/ Introduction
 - Methodology
 - Results
 - Discussion/ Implications
 - Acknowledgements

Sections of the **Clinical Research** Poster

- **Abstract/ Introduction**
 - Abstracts can be between 200-250 words.
 - They may include statistical analysis.
 - Up to three references can be added in format “(author, year)”.
 - A short introduction describing:
 - context of the case under study
 - case relevance

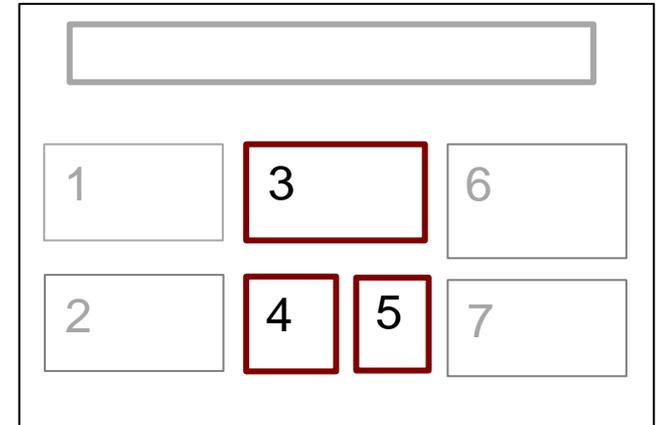


Be clear, state the significance and free of typographical errors.

Sections of the **Clinical Research** Poster

- **Case Description**

- Follow medical communication rules
 - history
 - physical examination
 - Investigative studies
 - progress and outcome
- Provide findings in easy-to-read tables and/or graphs.
 - Include a brief title to each table and graph.
 - This could be a direct explanation of the figure.



KISS – Keep It Short and Simple

Rule:

20% text

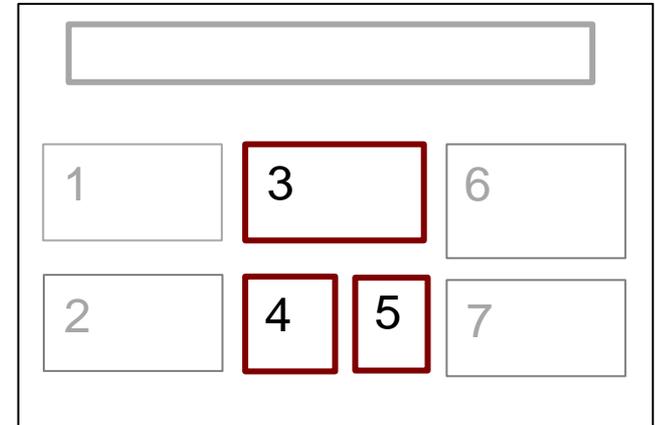
40% graphics

40% space

Sections of the **Clinical Research Poster**

- **Case Description**

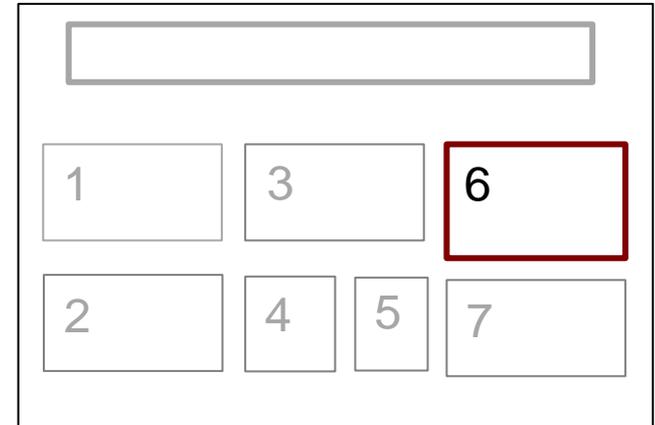
- Minimize abbreviation use.
- Be accurate.
 - Example, information on patient demographics could be depicted as a pie chart.
- Display clinical photographs to illustrate important points.



Avoid using the phrase that your case is the first to describe a particular phenomenon.

Sections of the **Clinical Research** Poster

- **Discussion/ Implications**
 - Review why decisions were made.
 - Are there other alternatives?
 - Are there similar cases?
 - What is the lesson of the case?

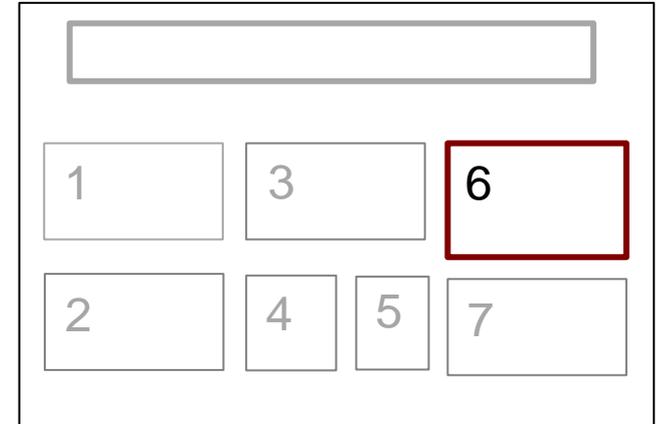


Best Clinical Research Posters make a small number of points clearly and succinctly.

Sections of the **Clinical Research** Poster

- **Discussion/ Implications**

- Review why decisions were made.
 - Are there other alternatives?
 - Are there similar cases?
- What is the lesson of the case?



- **Acknowledgments**

- Briefly acknowledge the following:
 - Individuals who assisted with project that are not authors.
 - Funding sources.
 - Disclose any conflicts of interest.



Scientific Posters

Clinical

- Main components:
 - Headings
 - Introduction
 - Case Description
 - Discussion
 - Acknowledgements

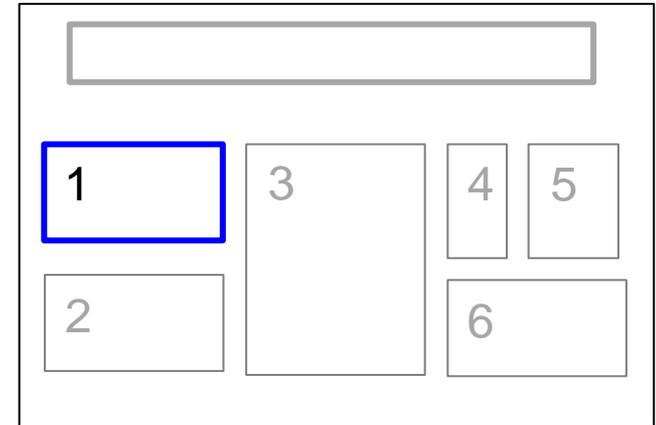
Basic/ Translational

- Main components:
 - Headings
 - Abstract/ Introduction
 - Methodology
 - Results
 - Discussion/ Implications
 - Acknowledgements

Sections of the **Basic/ Translational Research Poster**

- **Abstract/ Introduction**

- What is known in the field?
- Rationale or justification.
- Hypothesis and Methodology.
- Main Results
- How this work fits in the big picture.

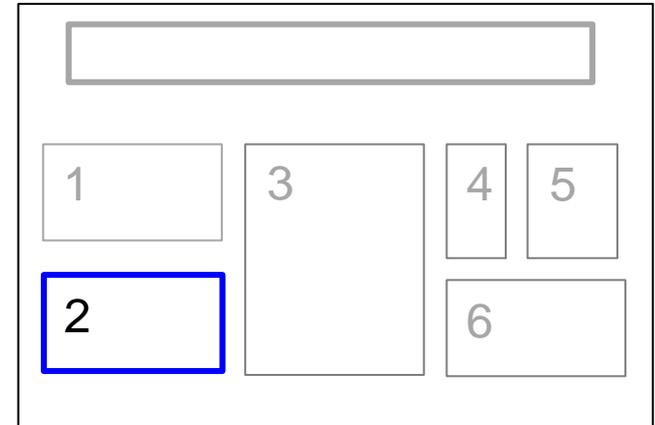


- This section should not exceed 200 words.
- **Do not** include tables or graphics!

Be clear, state the significance, make it interesting and free of typographical errors.

Sections of the **Basic/ Translational Research Poster**

- **Methodology**
 - If you are presenting a novel technique you may want to discuss with your mentor how much information to disclose in the poster.
 - Not required to be as detailed as in manuscript.



Type 1

Brief methodology description including parameters used, procedures, measurements and statistical analysis.
(Max 200 words)

Type 2

Represent your methods in a graphical way.

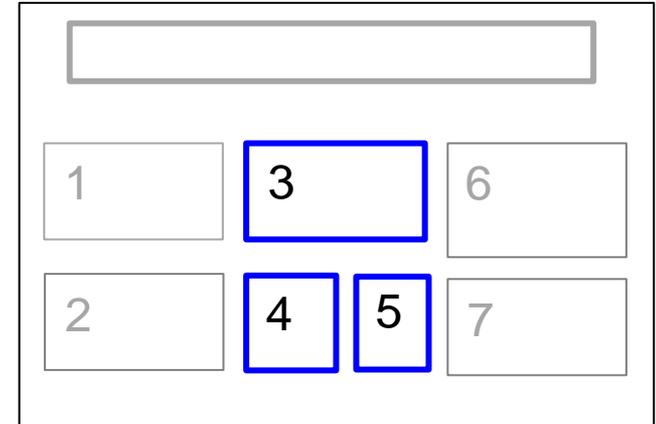
Type 3

Explaining methodology in the figure legends.

Sections of the **Basic/ Translational Research Poster**

- **Results**

- Provide findings in easy-to-read tables and/or graphs.
 - Include a brief title to each table and graph.
- Use simple 2D graphs, unless 3D is a need.
- Use bold lines and obvious patterns, otherwise they are hard to distinguish.
- Minimize abbreviations, do not use complicated language.



KISS – Keep It Short and Simple

Rule:

20% text

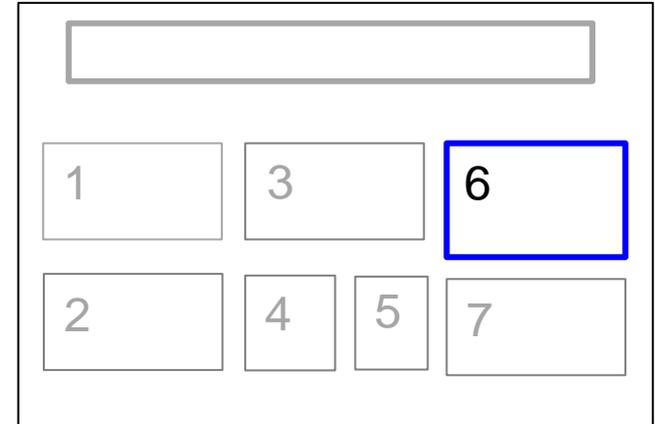
40% graphics

40% space

Sections of the **Basic/ Translational Research Poster**

- **Discussion/ Implications**

- Identify the most interesting findings.
- Provide interpretation and alternatives.
- Implications for the practice.
- Implications for research.
 - What should future studies in this area do?



Once again, be clear! If you are proposing a new mechanism, draw/ graph it.

Sections of the **Basic/ Translational Research Poster**

- **Acknowledgments**

- Individuals who assisted with project that are not authors:
 - provided reagents
 - gave criticism
 - assisted in lab
 - statistical help



- Funding sources.
- Disclose any conflicts of interest.
- Verify if your funding sources require for you to add their logo.
- If you include references, do not include more than three.

Before you Print...

- **Proofread!!** Make sure you follow the instructions (i.e. size) from the Meeting. Avoid grammatical errors.
- Get feedback from your mentor and friends.
- Make sure is legible, clean and well organized.
- Ask your peers if the message is clear and easy to understand or if they have to **hunt** to get it.
 - The viewer understand the objectives of the research you are presenting.
- Ask for a proof before the final print.
 - If you used a different computer operating system, there may be some differences and you may need to do some changes.

Do's and Don'ts

Do

- Keep your title catchy and focused.
- Make your poster readable from at least five feet.
- Use bold lines and brief titles for your graphs.
- If you include a photograph, add a thin black border to make it more visually appealing.
- Glossy paper looks more professional and is photo quality.
- If your topic is related to an audio subject or other visual aid, use an iPad/ Laptop on a stand next to your poster.

Don't

- Don't write a long title requiring more than 2 lines or ALL CAPS.
- Don't use neon colors for borders. Stick to 2-3 colors, avoiding red/green.
- Don't expect people will spend more than 3-5 minutes at your poster.
- Don't give your graphs colored backgrounds or grid lines.
- Don't leave out acknowledgments, including funding sources.
- Don't clutter your poster with many logos and too much information.

Prior your Poster Presentation

- Prepare yourself to stand next to your poster for approximately 2 hours. Wear comfortable shoes.
- Make your points in few words. Be prepared to answer viewer's questions. You will be repeating the same answers over and over. But **each person is hearing it for the 1st time!**
- Spend some time refreshing your memory on the relevant literature, the methodology and types of analyses used, and why.
- Be ready with extra materials for the poster and be ready with business cards if you intend to hand them out or meet with some key people.

At the Meeting

- Find the room/place where your poster session will take place.
- Wear **professional attire**. Remember your work and YOU are on display.
- Don't ignore anyone. Greet each new-comer with a CONFIDENT "Hello". Be enthusiastic!
- Acknowledge audience ahead of acquaintances during the poster presentation.
- Engage the audience without being too pushy. Read the body language.
- Leave a pen and a pad close to you to write comments or also to invite people to leave comments for you.

At the Meeting

- Keep a miniature version of your poster and more detailed information in case you need it.
- Place extra material, such as handouts, business cards, close to your poster. Restock if necessary.
 - Put them on a table or in an envelope hung with the poster.
- **This could be the best career move you make!
Have fun, relax and learn.**

Contact Information

Information:

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