

Scientific Poster Design

How to keep your poster
from resembling an
“abstract painting”



ccmr

Cornell Center for Materials Research

Cornell University, Ithaca, NY

<http://www.ccmr.cornell.edu>



A poster can be better than giving a talk

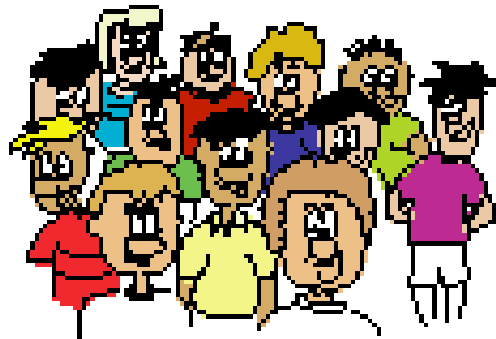
More efficient because:

- you totally bomb at giving talks
- can be viewed while you nap
- can hang in the department for years
- can reach folks not in your field of research



Posters serve as...

An advertisement of your hard work




Kool, wow!, check
this out!, you must
be smart!




It's just an illustrated abstract





Poster title goes here, containing strictly only the essential number of words...



Author's Name/s Goes Here, Author's Name/s Goes Here, Author's Name/s Goes Here
 Address/es Goes Here, Address/es Goes Here, Address/es Goes Here

Introduction

First ...

Check with conference organizers on their specifications of size and content before you start your poster. Make the poster size and format as professional as you can.

The typical size for poster presentations is 36" (91.4 cm) tall by 48" (121.9 cm) wide. Do not change the page size. You can scale the size smaller or larger size when printing. You need a different resolution with either a portrait or a landscape orientation.

Be sure that you do not use too much space allocated by your conference organizers (e.g., 36" x 48" vs. 48" x 36"). Do not make your poster larger than necessary. Don't change the size.

Method

Tips for making a successful poster ...

- Rewrite your paper in poster format. Simplify everything and use overall.
- Making a shorter poster is easier than both paper and longer cases post cards.
- Have some photos or graphs or line art to stress your point. Bold characters please.
- When laying out your poster leave breathing space around you text. Don't overcrowd your poster.
- Try using photographs or color graphics. Avoiding numerical tables.
- Spell check and get someone else to proofread.




Figure as an in-line graphic. Do not use a separate page for it. Do not use a separate page for it. Do not use a separate page for it.

Results

Highlighting the key ...

Pages such as photographs, graphs, diagrams, logos, etc. can be used on the poster.

For some cases images in your poster go through a process as follows: First, save the image in your computer as a high resolution file. Then save the image as a JPEG or TIFF. JPEG is the preferred format.

Be aware of the image size you are printing. The average resolution is 300 dots per inch (DPI) or 300 dots per inch (DPI). It should be at least 300 DPI. Call the University for more information.

Do not use images for trends.

Use color graphics ...

For all graphics use MS Word or other graphics software in Power Point.

Graphics on a poster should be printed in color. If you are printing in black and white, use a high resolution printer (e.g., 300 DPI or higher). Do not use a low resolution printer (e.g., 72 DPI or lower). Do not use a low resolution printer (e.g., 72 DPI or lower).




Figure as an in-line graphic. Do not use a separate page for it. Do not use a separate page for it. Do not use a separate page for it.

Aim

How do you do it? ...

Simplify the key points and make it easy to read. Do not use too much space. Do not use too much space. Do not use too much space.

The body text should be between 12 and 14 point. Arial, Helvetica or similar.

Keep your text aligned to the right. Do not justify.

The color of the text and the background color should be chosen carefully.

Conclusion

For more information on Poster Design, Scanning and Digital Photography, and more ...

Contact: Medical Illustration Unit, Princeton Hospital

Phone: 609-251-2200

Email: medillustr@princeton.edu

Website: www.medillustr.com

Acknowledgements

Just highlight the names of those who helped you. Do not use too much space. Do not use too much space. Do not use too much space.



Is my abstract effective?

- Why should anyone care?
- What am I adding to current knowledge?
- Do I need to explain methods?
- Have I told them what I found and recommend?



A portrait of a grad student



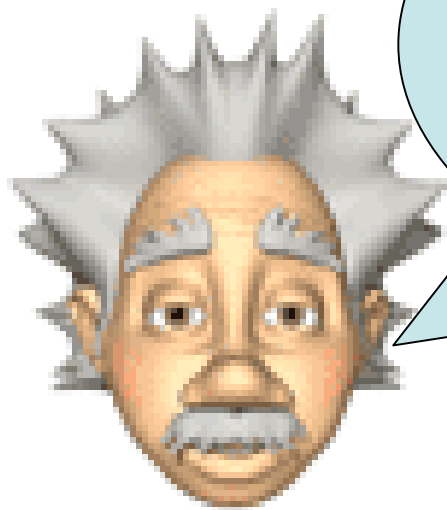
@#&%!@#\$, I have 12 hours to throw this thing together and get it printed before it's due.



How do I get months and years of research onto my poster?



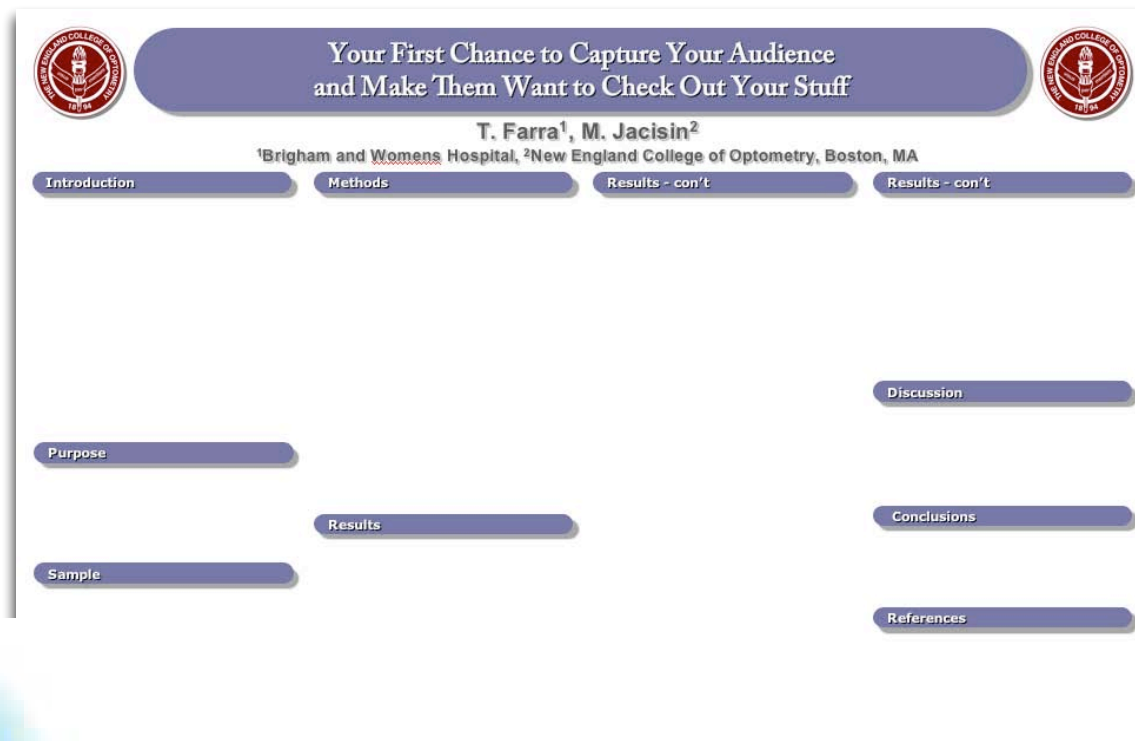
- Your poster is a short story
- Describe a few major points
- Arouse the reader's interest to read on
- Limit it to 250 words



Recite after me,
Less is best!

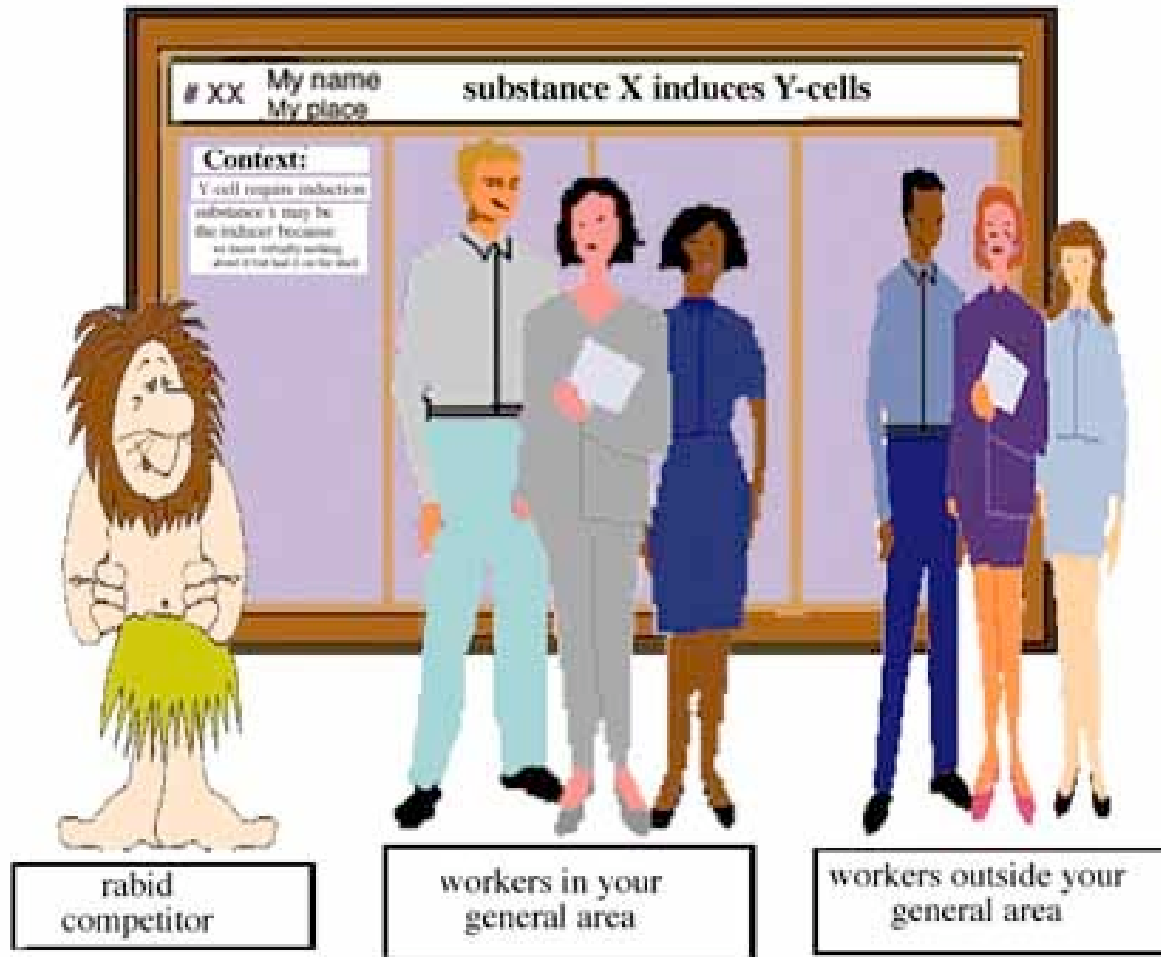


Simplify your paper into poster format

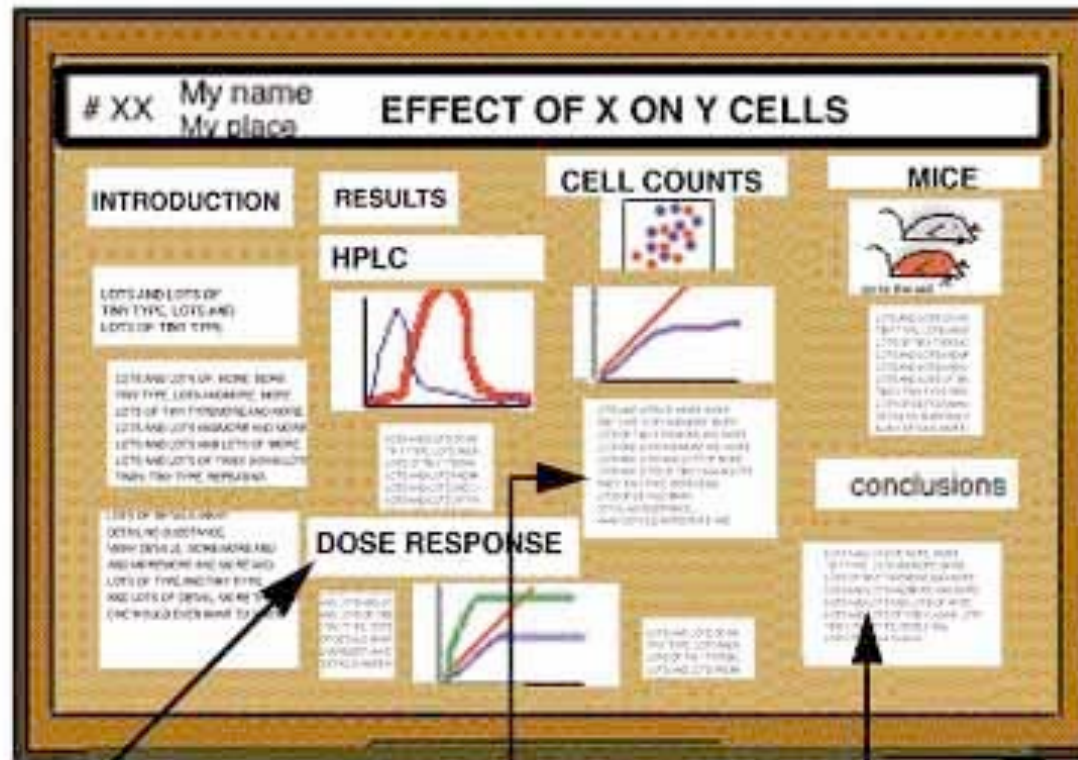


Find out the size required!

Who's my audience?



Remember, most of these “scientists”
come for the free booze



Large type
states methods,
not results

Results
artfully buried in a
methods description

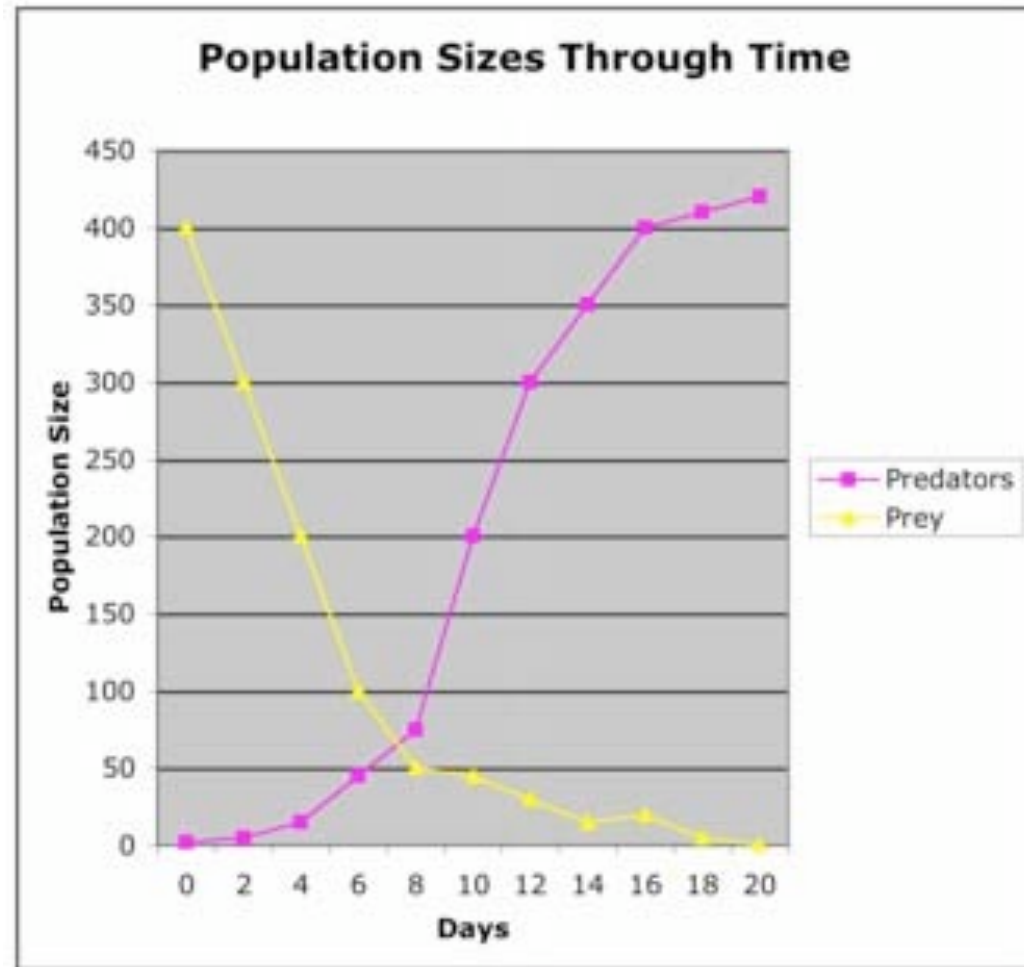
Carefully
omits
interpretations

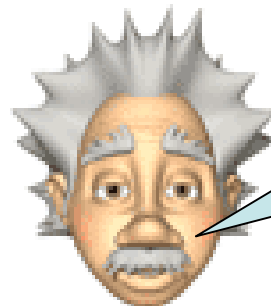
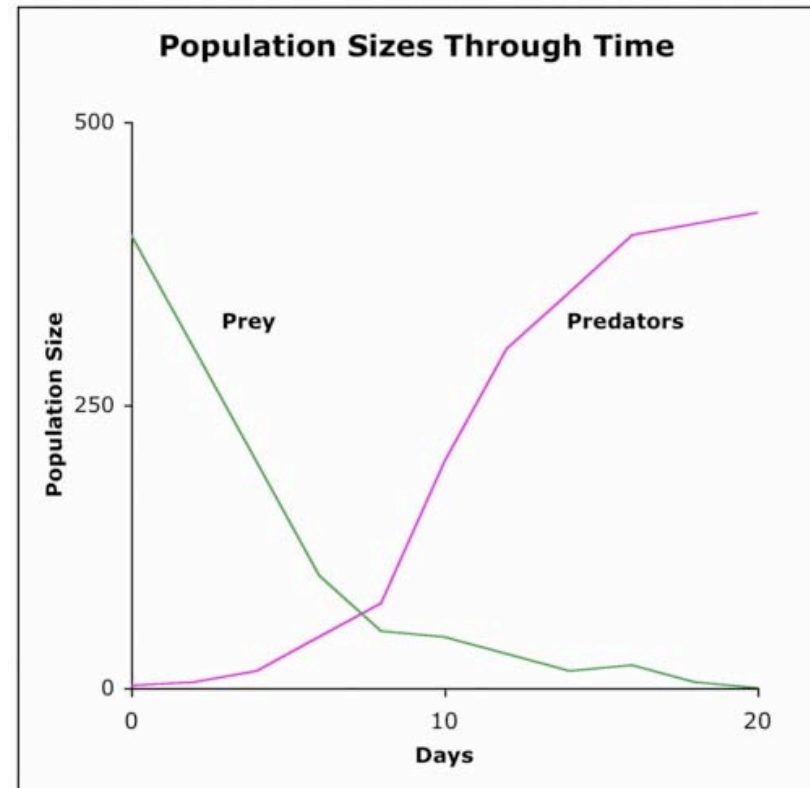
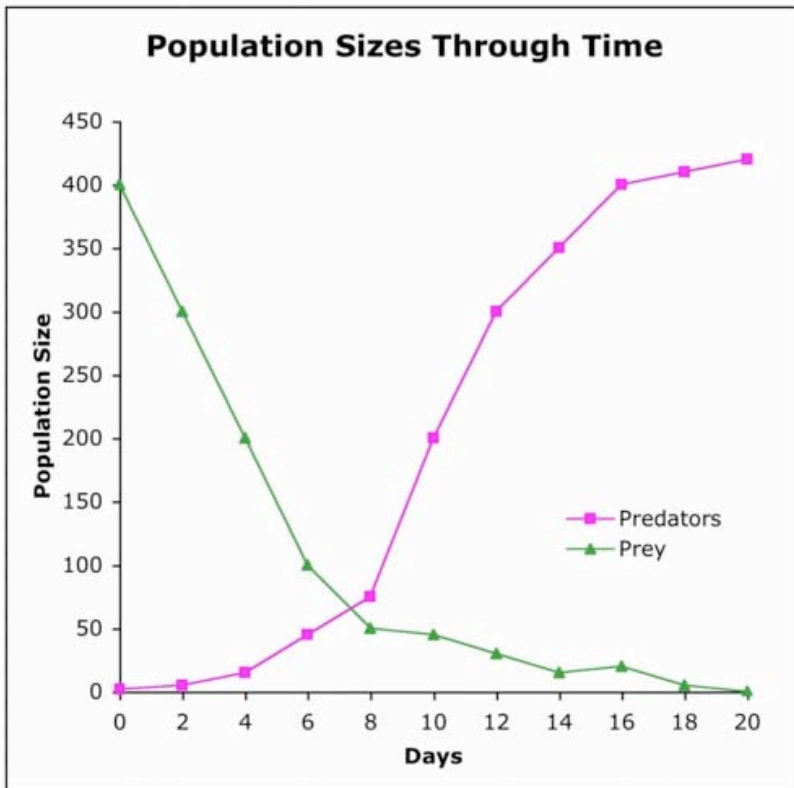


Start putting
together your
2 main elements

1) Simple, effective data displays

Don't make them stand on their heads to read your data!



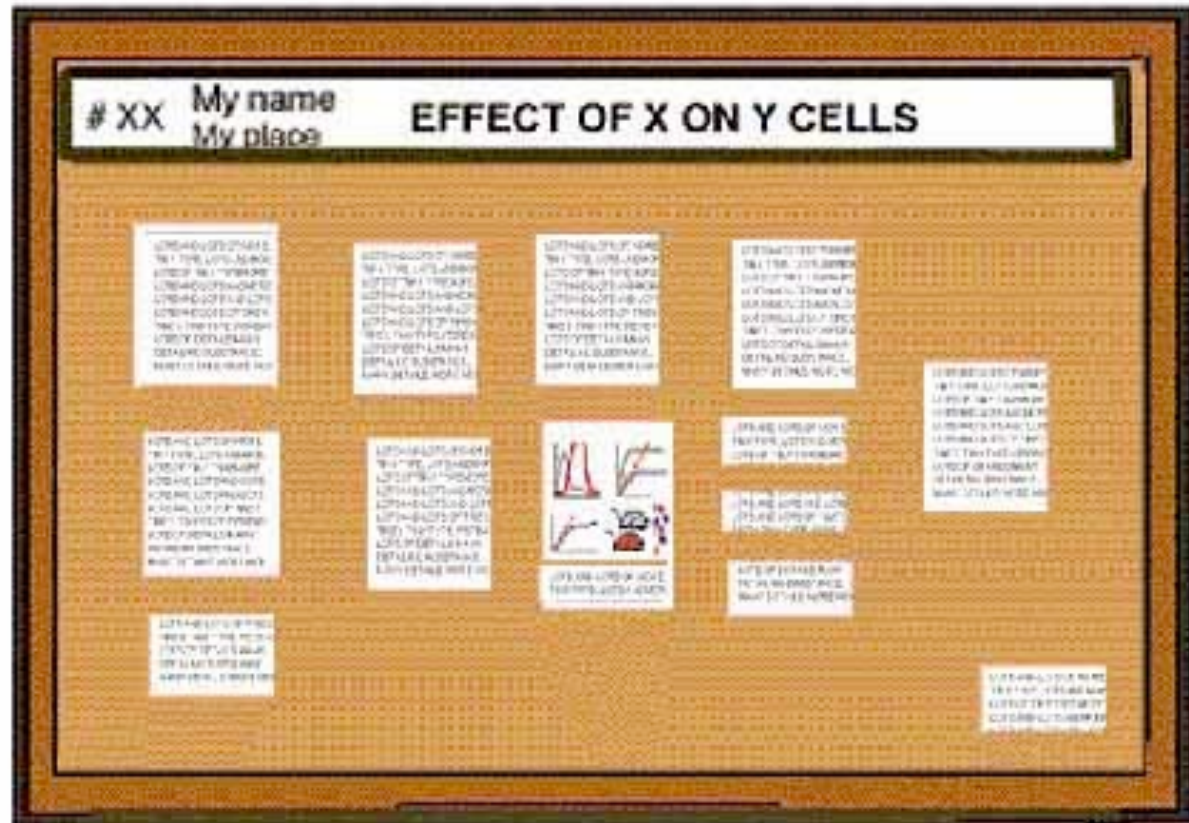


Keep it simple
but effective

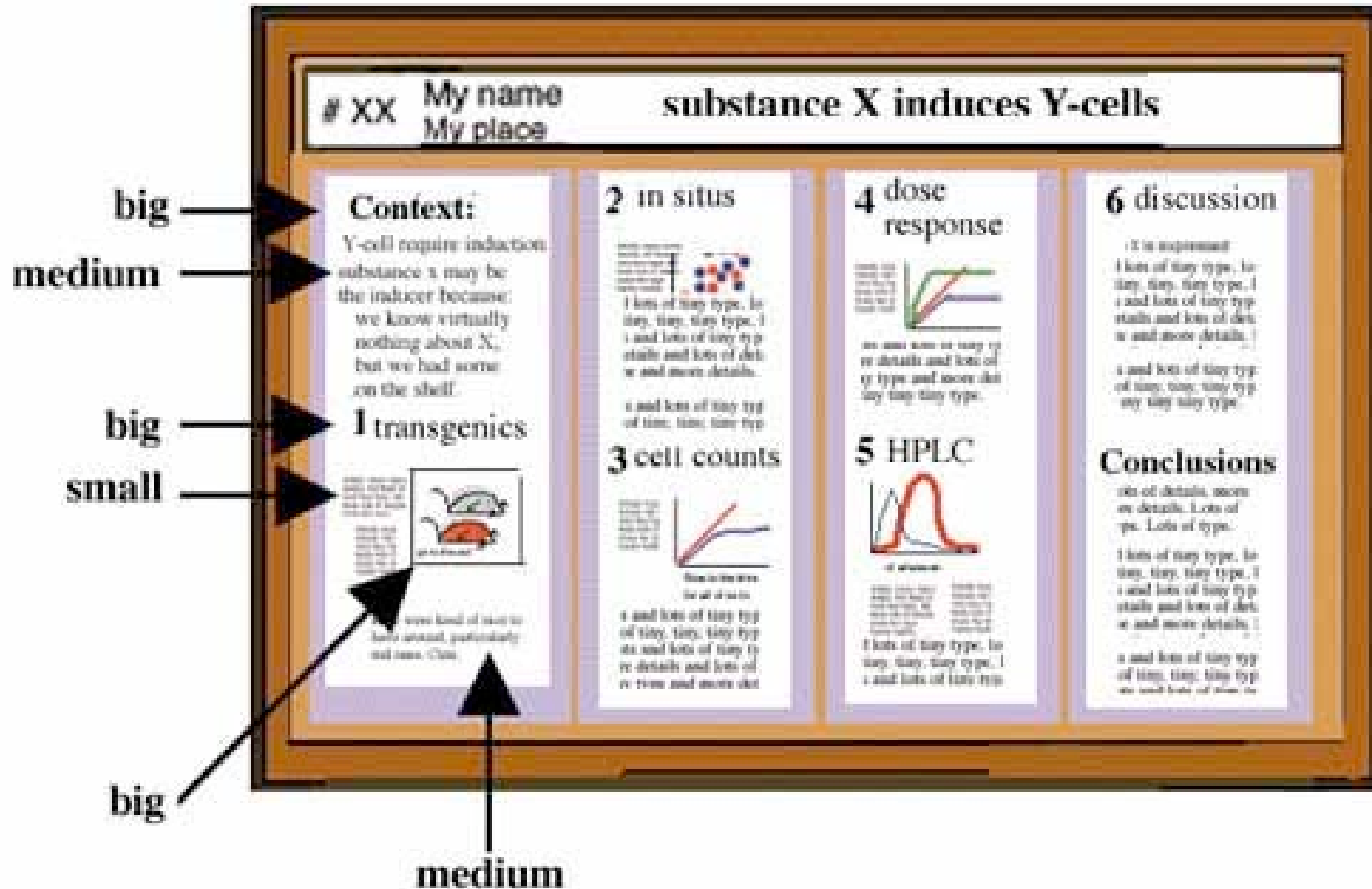


2) Small blocks of supporting text

The need for chairs in front of your poster will not go over well



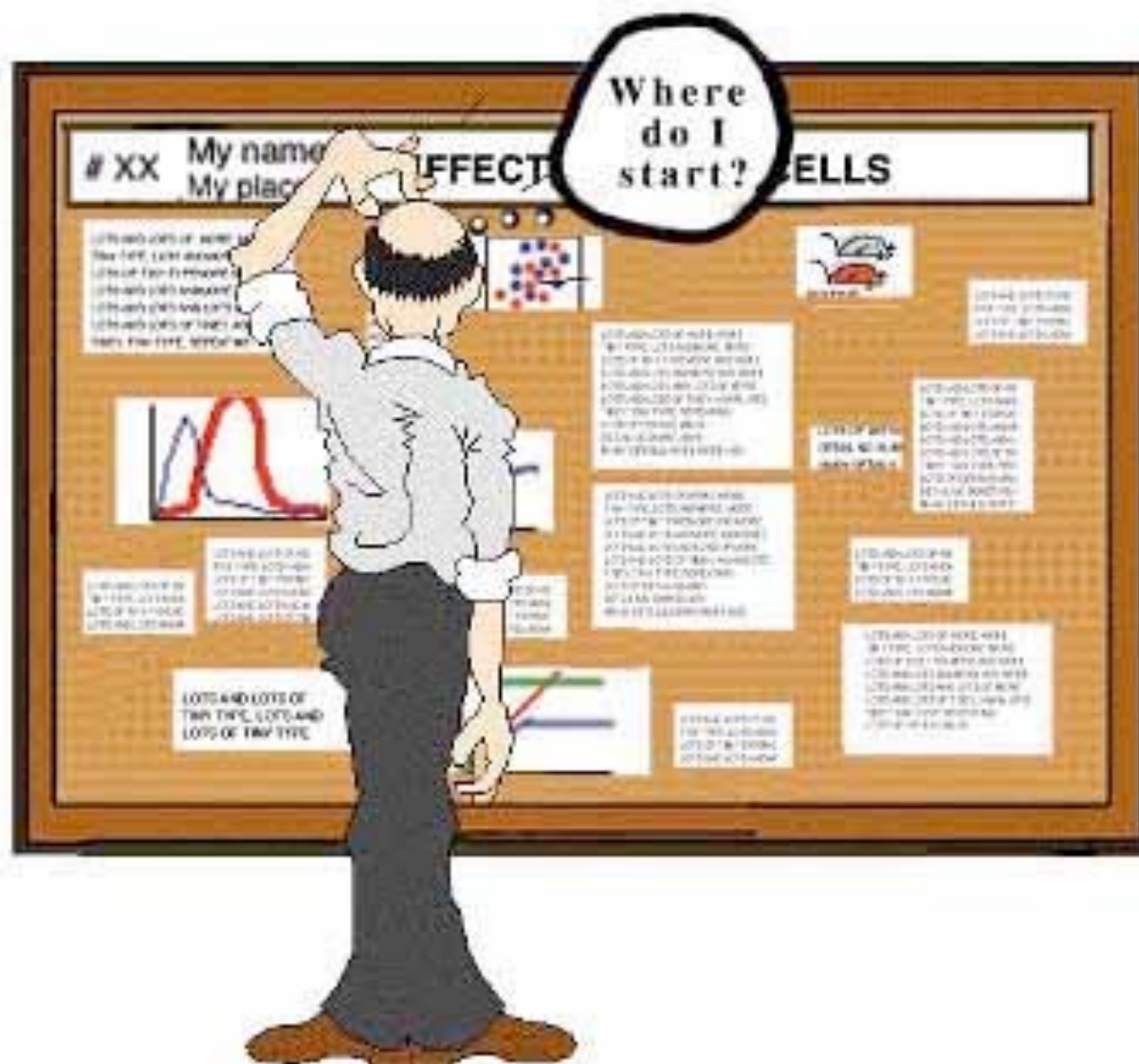
I could actually read this





Your copy should answer...

# XX	My name My place	EFFECT OF X ON Y CELLS
Why?	Methods?	What do I recommend?
What am I adding?	What did I find?	





Pick a software program

Although you'll probably gravitate towards PowerPoint, consider a true design program.

www.postersw.com for free poster programs



PowerPoint



- OK, but the colors will suck
- Easy to use
- Inflexible
- Designed for low resolution



Adobe Illustrator or InDesign



- Excellent
- More difficult to learn
- What you see is what you get
- Others: Canvas, Publish-It, Corel Draw, LaTeX, etc.

www.postersw.com for free poster programs



Let's build a poster!



Your poster title:

Think BIG! Really Big!

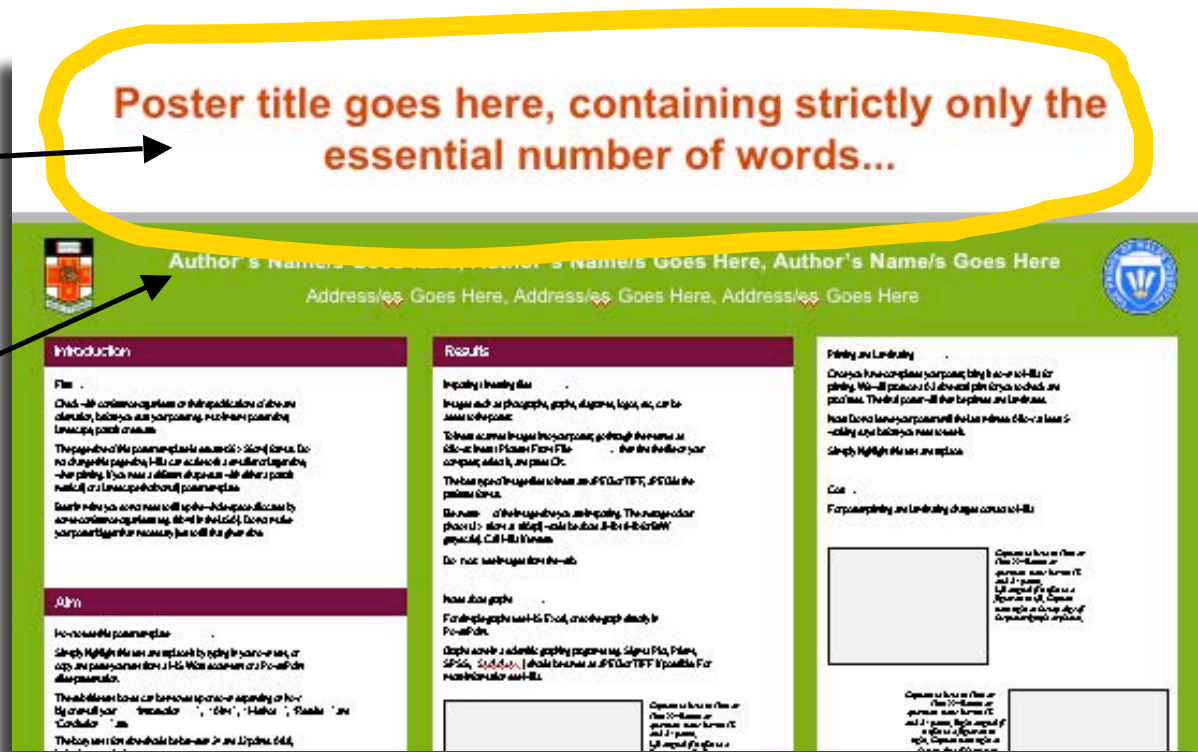
Your biggest impact!

Boldface type

Not all caps!

Poster title goes here, containing strictly only the essential number of words...

Group authors names and affiliations





The Secrets of Killer Body Text:

XX My name
My place

EFFECT OF X ON Y CELLS

INTRODUCTION

LOTS AND LOTS OF
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RESULTS

HPLC

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DOSE RESPONSE

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CONCLUSIONS

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Large type states methods, not results

Results artfully buried in a methods description

Carefully omits interpretations




Poster title goes here, containing strictly only the essential number of words...



Author's Name/s Goes Here, Author's Name/s Goes Here

Address: Goes Here, Address: Goes Here



Introduction

Check all contents against your application of the...
 The paper...
 Summary...

Abstract

How to write...
 Simply highlight...
 The abstract...
 Keywords...
 The author...
 Do not...

Method

Tip for clarity...
 For...
 Use...
 When...
 To...
 Spell...

Results

Importing...
 To...
 The...
 Results...
 Do not...

Conclusion

For...
 Conclude...
 Do not...

Acknowledgements

Use...
 Do not...

- Leave breathing space around your text
- Plain fonts
- Same size and style
- Left-aligned



Hi there, my name is mitch collinsworth and I would like to tell you about myself and how I got this job at cornell. Well you see, my uncle had a friend who knew my cousin on the other side and his daughter worked for facilities. I was down on my luck and my sister told me she knew a guy who's nephew's wife's kid worked for this guys father and what can I say , he hired me with no questions asked and just told me to keep my mouth shut. So here I am at CCMR.



Hi there, my name is mitch collinsworth and I would like to tell you about myself and how I got this job at cornell. Well you see, my uncle had a friend who knew my cousin on the other side and his daughter worked for facilities. I was down on my luck and my sister told me she knew a guy who's nephew's wife's kid worked for this guys father and what can I say, he hired me with no questions asked and just told me to keep my mouth shut. So here I am at CCMR.

Conclusions first!

- Put the most important part first!
- Short and to the point!
- Upper left hand corner

**Your Ingenious Teaser Right Here to Woo Them
Down to the Body**

Thomson Reuters | 2007

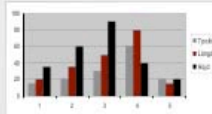
Conclusions first: 44 pt bold
Always put the most important part - your conclusions - first! Place your conclusions in the upper left hand corner of your poster.
Prepare your material from the reader's perspective. What was done, by who and your conclusion has to be understood within a couple of second's reading! Use active voice when writing the text. **Text size: 34 pt regular**

Introduction
Posters are primarily visual presentations. Your poster should be dominated by self-explanatory illustrations such as graphs and pictures while the amount of text should be kept to the minimum.

Your aim
Your poster is an advertisement for your research and as such it needs to be eye-catching and straight to the point. You only have seconds, or at best a few minutes to attract the attention of the visitor to a poster session. Keep your message short and clear


Your message
Keep your message clear and your text concise. Decide what is relevant for this poster and try to get your message across to your target group.

Layout, photos and print
Contact [Madhuban](#) at University Library for help with layout and image enhancement. For printouts and professional photographers contact [Sudhakar](#). For more information: www.thomson.com/rls




Tips:
The best font for text blocks that are as short as they should be on a poster is a Sans Serif typeface family. Therefore, use sans serif fonts such as Arial or ~~Times~~ sans rather than serif fonts like Times or Courier.
AVOID CAPITAL LETTERS IN TEXTS THAT ARE LONGER THAN ONE LINE, SINCE THEY ARE MORE DIFFICULT TO READ.

Handouts
If you succeed in getting the reader's attention, provide her/him with more detailed information in the form of handouts or printed articles. Include references on your handout instead of your poster.

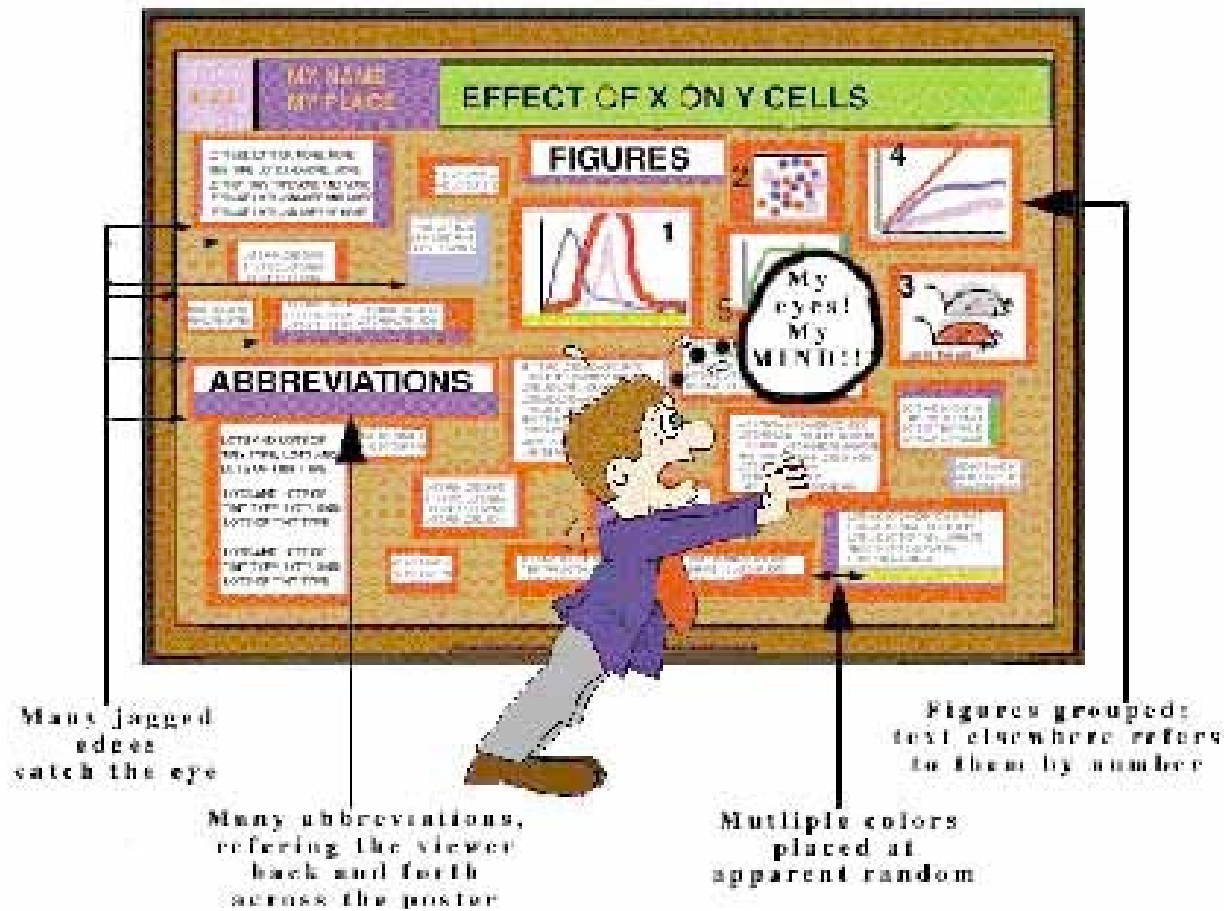


It is always nice to put in a picture and write some few short notes of what's going on in the future. Put handouts, business cards, nearby - on a table or in an envelope hung with the poster.

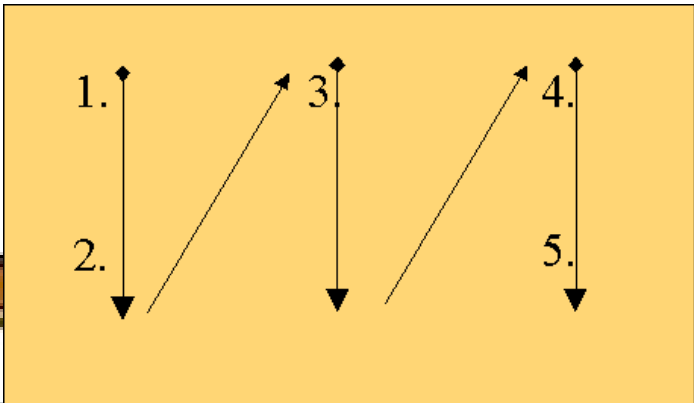


[Kathryn A. Johnson](#), [Madhuban](#)
[Faculty Chair, Materials Research](#) [Vidya Venkatesh Deshpande](#), [T](#)
[Senior](#) [For open access](#) [Telephone: 607/255-1122](#) [e-mail: \[madhuban@cornell.edu\]\(#\)](#) [e-mail: \[venkatesh@cornell.edu\]\(#\)](#)

Easy for the eye to follow



Utter chaos will make folks dizzy!



XX My name substance X induces Y-cells
My place

Context:
Y-cell require induction substance x may be the inducer because we know virtually nothing about X, but we had some on the shelf.

lots and lots of tiny, tiny and lots and lots more details on tiny type and tiny tiny tiny lot of type lots and lots . Details a tails, more a. Lots of

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lots of details, on details. Lots Lots of type.

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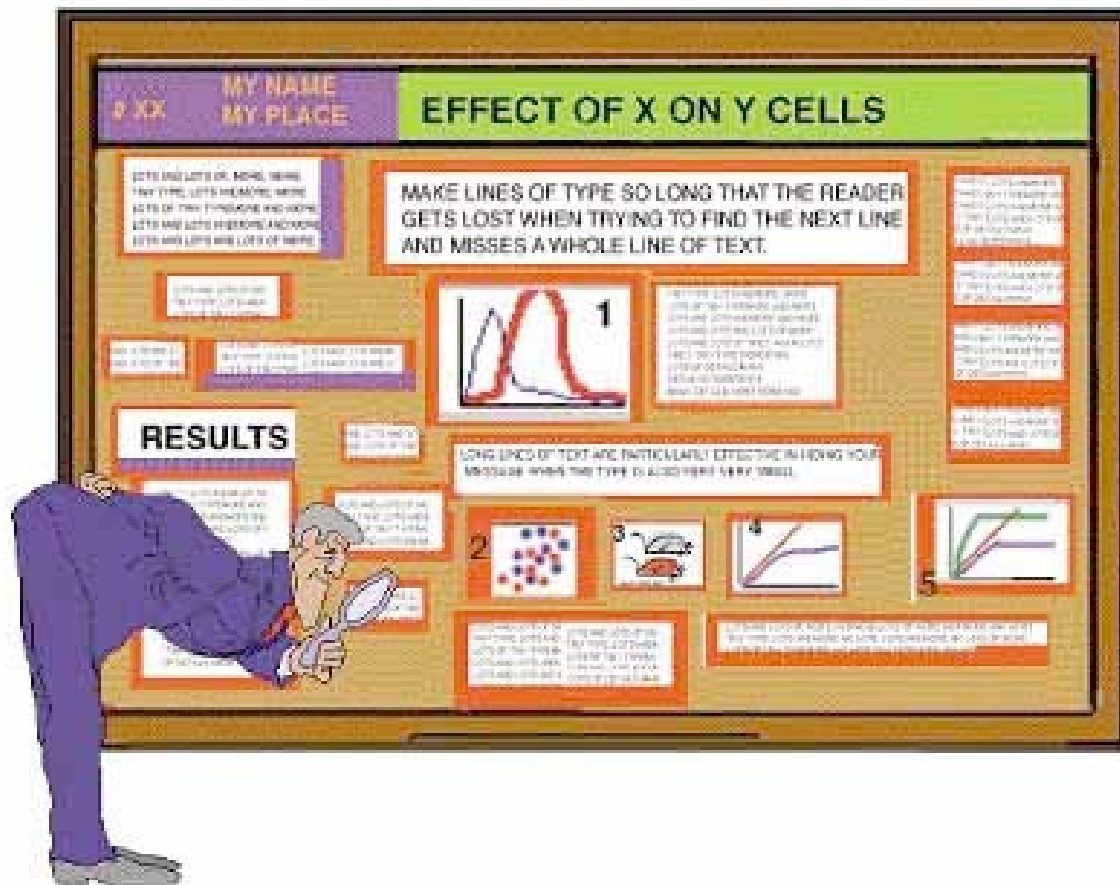
6 lots of type lots and lots Details and lots of details, more on details. Lots of type. Lots of type.

lots of tiny type, lots and lots of tiny type, lots and lots of tiny type and lots of details and lots of details and more details.

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lots and lots of it lots of tiny, tiny, it and lots and lots of more details and tiny type and me tiny tiny tiny

Can anyone read your body text?



Text sizes:

Title: 85 point

Authors: 56pt

Sub-headings: 36pt

Body text: 24pt

Captions: 18pt

Your Ingenious Teaser Right Here to Woo Them Down to the Body

Conclusions first: 44 pt bold
Always put the most important part - your conclusions - first! Place your conclusions in the upper left hand corner of your poster. Prepare your material from the reader's perspective. What was done, by who and your conclusion has to be understood within a couple of second's reading! Use active voice when writing the text.

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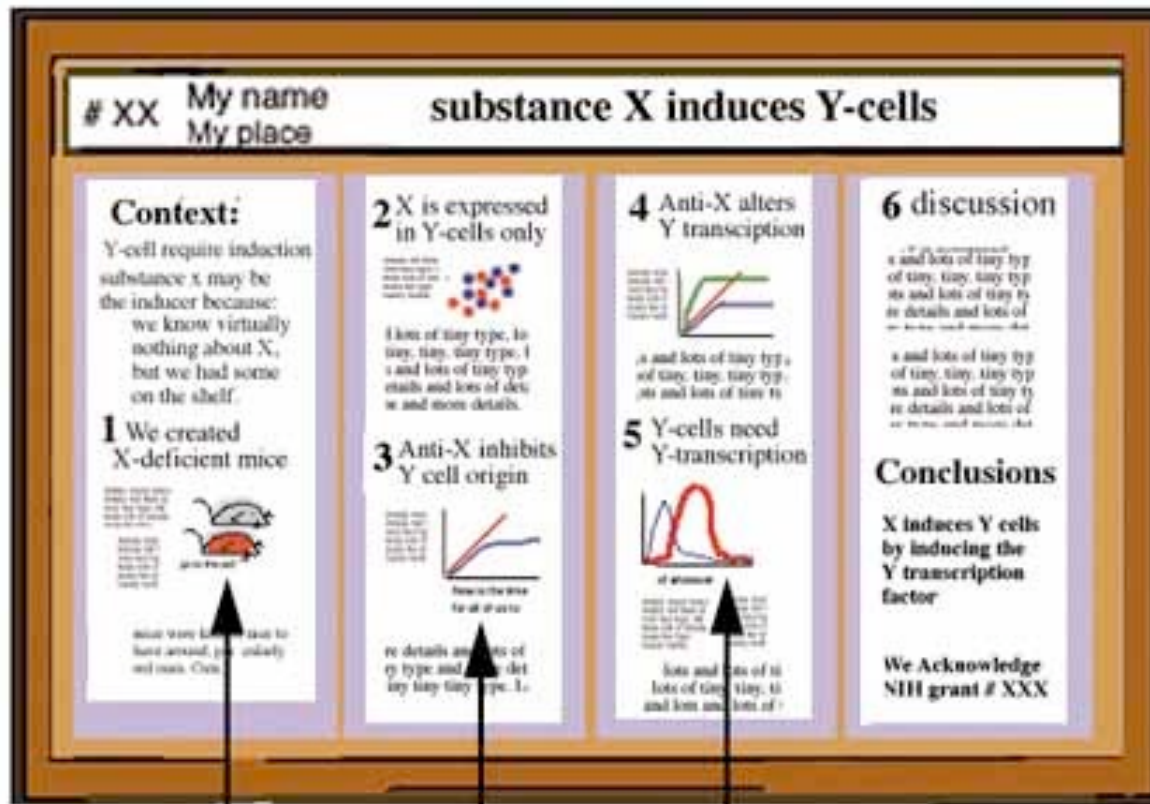
Layout, photos and print
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Tips:
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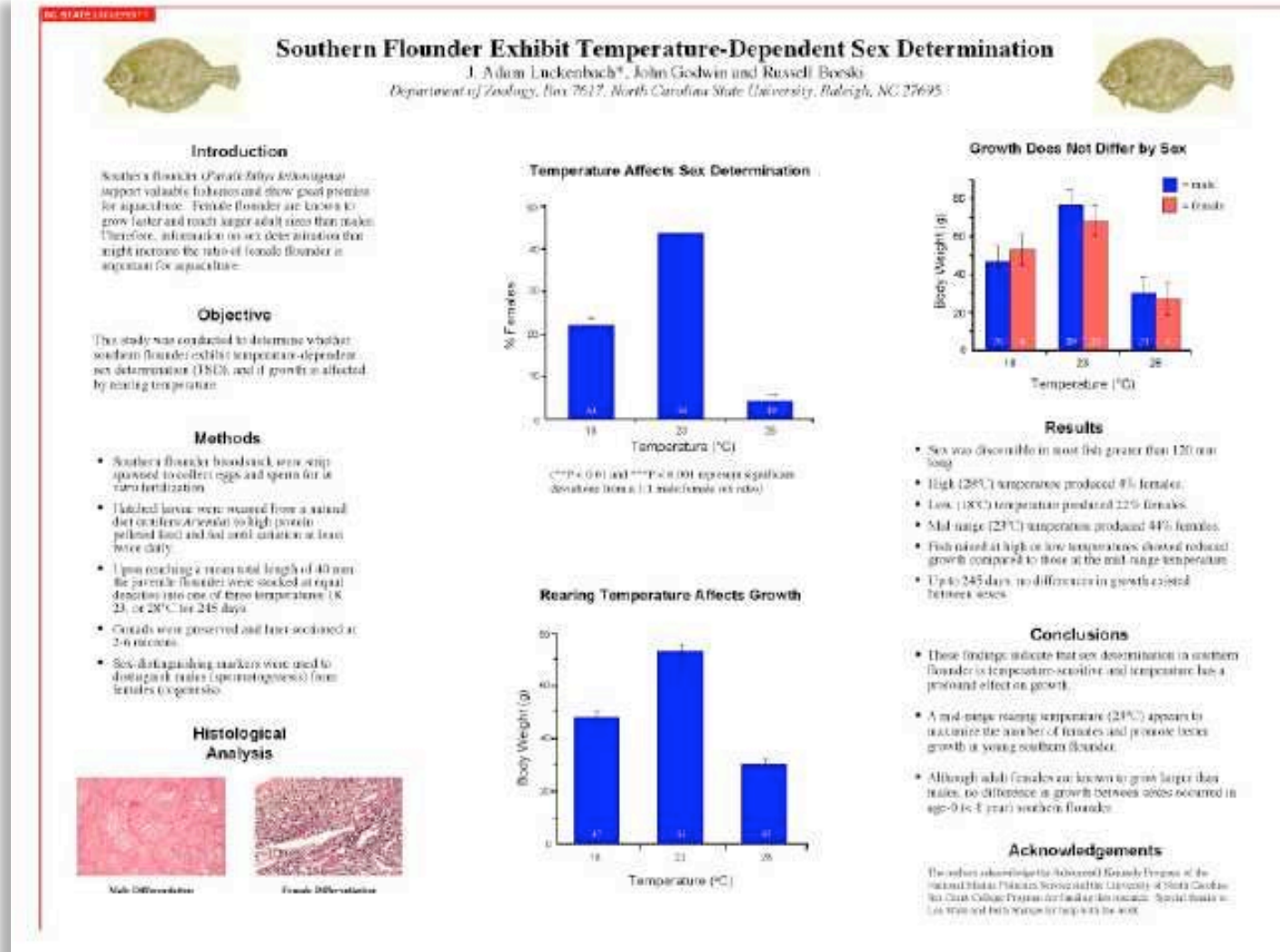
It is always nice to put in a picture and write some few short notes of what's going on in the future. Put handouts, business cards, nearby - on a table or in an envelope hung with the poster.

Images and graphs say much more than words



BIG figures that use color

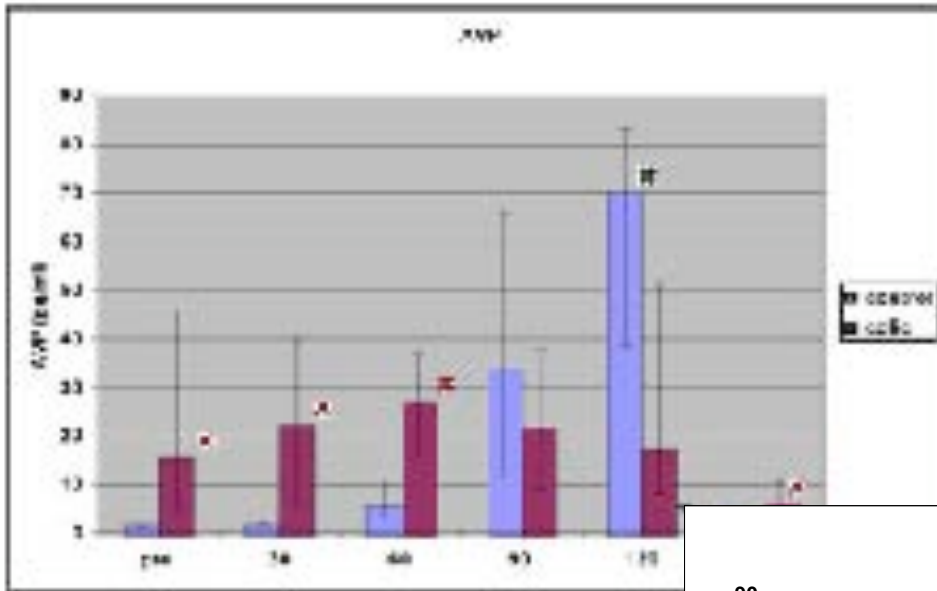
Keep posters visual!



Picture perfect photos

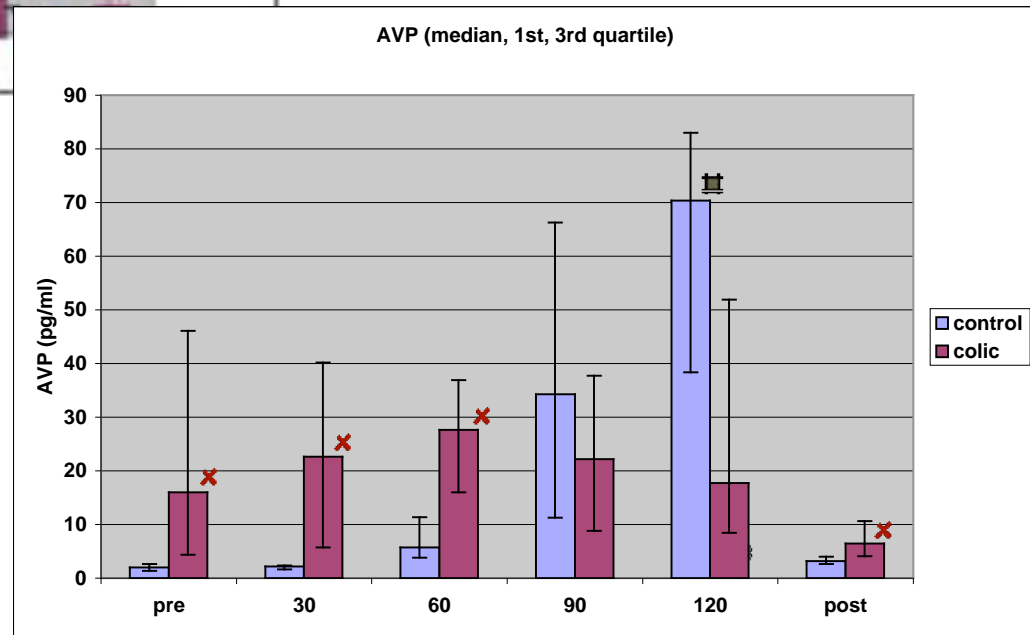
- Avoid resolution overkill!
At least 150 dpi, but no more than 350 dpi
- Save photos as jpg or png
Line art as a png (graphs)
- Web images are usually
poor resolution

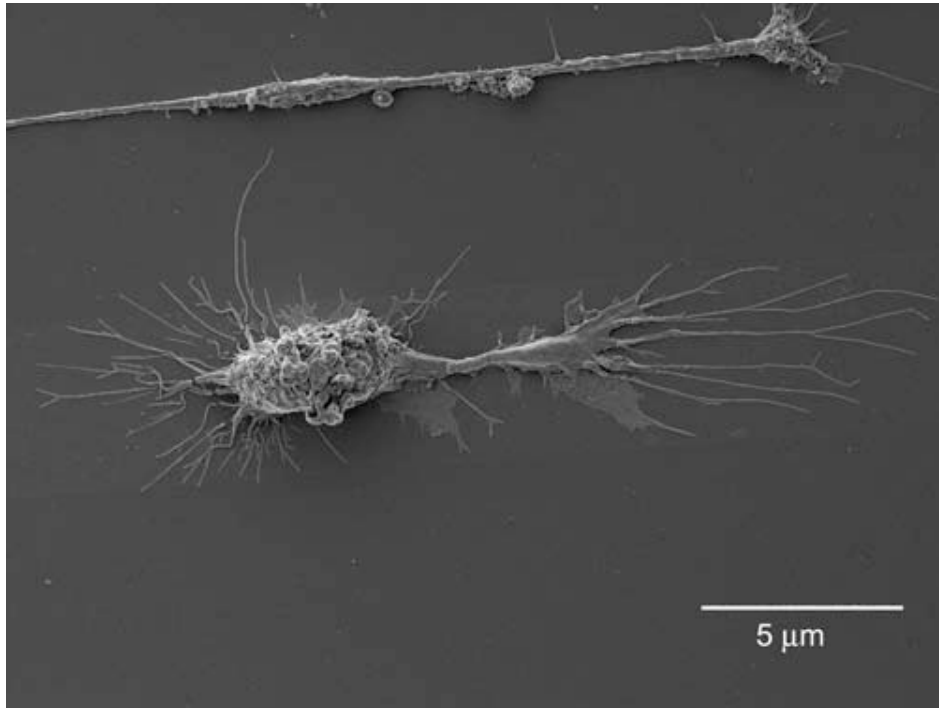




jpg

png



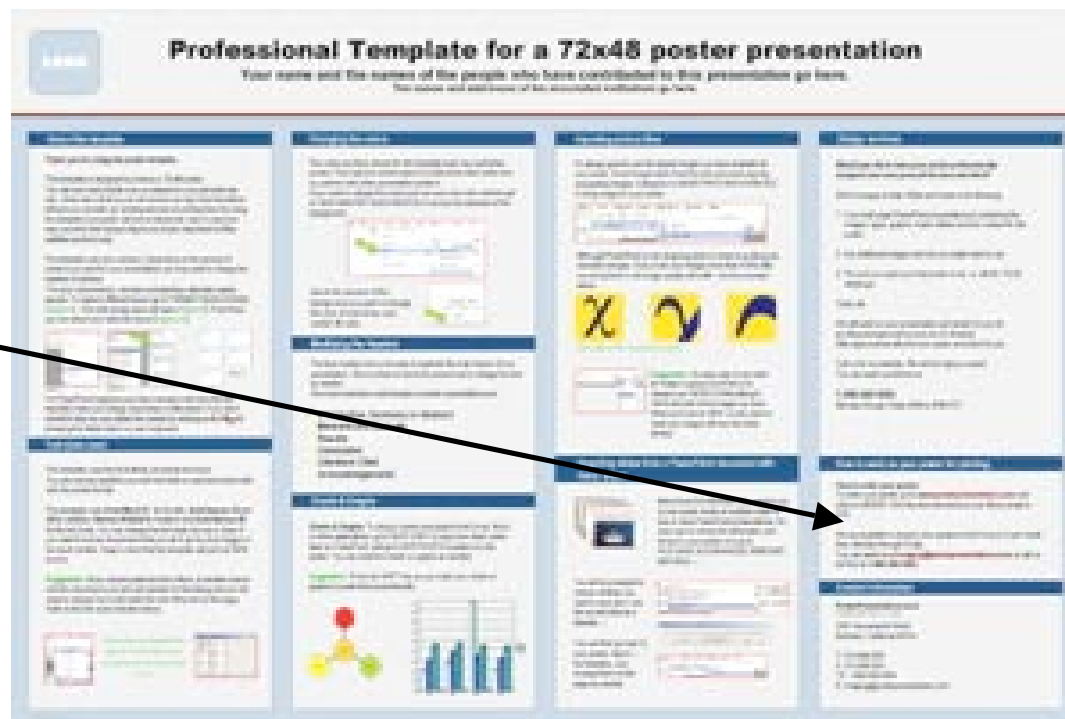


Your cool images
mean nothing
without a
scale bar or
description



Don't forget your funding acknowledgements

CNF-NSF-BMR, etc
Your department can provide you with the required wording





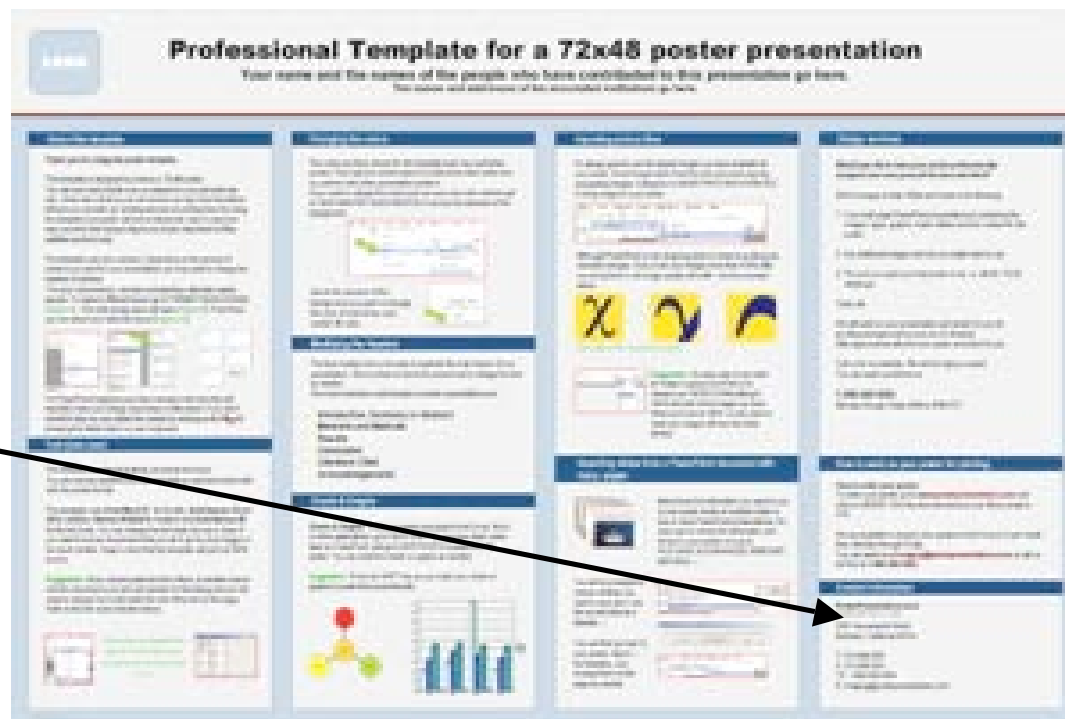
Your contact info!!!

Without it you'll become

“ya know, those guys with the awesome poster”

Include all
contact info:

- Mail address
- Phone
- E-mail





Using color to engage your readers

2-3 colors, no more!

Dark type on light color background

Poster title goes here, containing strictly only the essential number of words...

Author's Name/s Goes Here, Author's Name/s Goes Here, Author's Name/s Goes Here
Address/es Goes Here, Address/es Goes Here, Address/es Goes Here

Introduction
 Post ...
 Check with conference organizers on their specifications of size and orientation before you start your poster. Most poster sizes are 42x108cm (16 1/2x42 1/2 inches) or 48x120cm (19x48 inches). The poster should be printed on a standard size, 1/4 inch can scale to a smaller or larger size when printing. You need a different program with either a portrait or a landscape orientation.
 Size: In many cases, you will be asked to display a poster at a conference. If you are displaying a poster, it should be 1/4 inch (6.35 cm) high and 36 inches (91.44 cm) wide. Do not make your poster bigger than necessary to fill the wall size.

Method
 Test for making a successful poster ...
 • Review your paper in poster format. Simply overlaying a grid over it.
 • Headings of more than two words should both upper and lower case your capitals.
 • Headings of more than two words should both upper and lower case your capitals.
 • When laying out your poster, leave enough space around your text. Don't overcrowd your poster.
 • Try using photographs or color images. Avoid using numerical tables.
 • Spelling check and grammar check are important.

Results
 Reporting the results ...
 Images such as photographs, graphs, diagrams, logos, etc. can be added to the poster.
 To save space in images, they can be printed through a computer as follows: Print from File and then from your computer select print as PDF.
 The best image format is either JPEG or TIFF. JPEG is the preferred format.
 Beware: If the image is too large, the average color photo (130 x 180) would be about 3MB. (Most 800 x 600) would be about 1MB. Call MIT Libraries.
 Do not use images from the web.
 How do you graph ...
 For simple graphs use MS Excel or a graphing software in Power Point.
 Graphs can be made with graphing programs (eg. Sigma Plot, Plot, JREB, etc.) and also can be made as JPEG or TIFF files. For more information see MIT.

Conclusion
 For more information on Poster Design, Scanning and Digital Photography, and Image Editing:
 Contact:
 Medical Illustration Unit
 Photo of Walls in Capital
 Photo 22300
 Email: photo22300@mit.edu
 Website: photo22300.mcg.mtu.edu

Acknowledgements
 Justify rights to your own work. Reproduce with your text.



Whoa! Where's my sunglasses?

POSTER TITLE GOES HERE, CONTAINING STRICTLY ONLY THE ESSENTIAL NUMBER OF WORDS...

Author's Name/s Goes Here, Author's Name/s Goes Here, Author's Name/s Goes Here
Address/es Goes Here, Address/es Goes Here, Address/es Goes Here

Poster Title

Post ...
Check with conference organizers on their specifications of size and orientation before you start your poster. You may need a poster stand (and space) for poster viewing.
The page size of this poster template is A0 (36" x 48") in landscape (horizontal) format. Do not change the page size. You can scale it to a smaller or larger size when printing. You need a different setup size with either a portrait (vertical) or a square poster template.
Bear in mind you do not need to replicate wide space allocations by some conference organizers (e.g. SIAM) in USA. Do not make your poster bigger than necessary for wall display.
Check with conference organizers on their specifications of size and orientation before you start your poster. You may need a poster stand (and space) for poster viewing.
The page size of this poster template is A0.

Poster Content

Tip for making a successful poster ...
• Rewrite your paper in poster format. Simply everything and state overall.
• Headings other than Section should be both upper and lower case post capitals.
• Never go wide and narrow in capitals or underline areas your poster use bold characters (use).
• When laying out your poster leave plenty of space around you text. Don't overcrowd your poster.
• Try using photographs or other graphics. Avoid long numerical tables.
• Spell check and grammar check before proofread.

Poster Graphics

Printing (hardcopy) ...
Once you have completed your poster (only known to you or printing), you will proofread it before you print and proofread. The final poster will be printed and delivered.
If you do not like your poster until the last minute, allow at least 24 hours for your poster to be proofread. Simply highlight the areas to replace.

Poster Contact

Poster Design (Scanning and Digital Photography, and Image/Video).




Contact:
Medical Illustration Unit
Rothman/Walker Hospital
Ph: 855.2200
Email: 855.2200@cornell.edu
Webpage: <http://med.illustr.cornell.edu>

Just highlight the areas to replace with your own text. Replace it with your text.

This attracts attention but wears out the eye



Be careful with the primary colors

			
51.102.255 #3366FF	102.51.255 #6633FF	204.51.255 #CC33FF	255.51.204 #FF33CC
			
51.204.255 #33CCFF	0.61.245 #003DF5	0.46.184 #002EB8	255.51.102 #FF3366
			
51.255.204 #33FFCC	184.138.0 #B88A00	245.184.0 #F5B800	255.102.51 #FF6633
			
51.255.102 #33FF66	102.255.51 #66FF33	204.255.51 #CCFF33	255.204.51 #FFCC33





Blue on Red appears blurry to the human eye.

Yellow on white is hard to read

Red on Blue appears blurry to the human eye.



• aeiko



• Peach Green & Seeds



• Rust



• dollar



<http://www.colorschemer.com/online.html>

Be aware of busy backgrounds

NC STATE UNIVERSITY

Snook Growth in Habitats with Differing Abiotic Variability

Alesia Read, North Carolina State University, anread@unity.ncsu.edu

PROPOSED OBJECTIVE

To create a useful tool for assessing potential stocking habitats based on degree of variability in water quality.

- Snook are a popular game fish found in the estuarine creeks of Florida
- Snook population has been on the decline due to overfishing and habitat degradation
- Numerous stock enhancement endeavors are currently underway without sufficient preliminary research
- Abiotic variability is a prominent feature of these estuaries
- Temperature, dissolved oxygen and salinity might play influential roles in the survivorship of the juvenile snook

STUDY SITES

RESULTS

North Creek Lower (High Variability)

Negative Growth:
Dissolved Oxygen (mg/L) 0-22
Salinity (ppt) 2-21
Temp (°C) 25-34

North Creek Middle (Medium Variability)

Positive Growth:
Dissolved Oxygen (mg/L) 0-8
Salinity (ppt) 16-28
Temp (°C) 30-38

North Creek Upper (Low Variability)

Slow Growth:
Dissolved Oxygen (mg/L) 0-4
Salinity (ppt) 16-30
Temp (°C) 26-33

METHODS

1. Juvenile snook are raised in fingerlings (100-200 mm) in the aquaculture facility
2. All snook are tagged with identifying markers for individual growth measurements
3. Fish are placed in cages within variable habitats at the research sites for 40 days
4. Fish are weighed and measured for growth

CONCLUSION

- Snook exhibit increased growth in habitats with a medium degree of abiotic variability
- Stock enhancement projects will be more efficient by releasing juvenile snook primarily in nursery habitats with a medium degree of abiotic variability

NC STATE 12/09/13



Southern Flounder Exhibit Temperature-Dependent Sex Determination

J. Adam Luckenbach*, John Godwin and Russell Boeski
 Department of Zoology, Box 7617, North Carolina State University, Raleigh, NC 27695



Introduction

Southern flounder (*Paralichthys lethostigma*) support valuable fisheries and show great promise for aquaculture. Female flounder are known to grow faster and reach larger adult sizes than males. Therefore, information on sex determination that might increase the ratio of female flounder is important for aquaculture.

Objective

This study was conducted to determine whether southern flounder exhibit temperature-dependent sex determination (TSD), and if growth is affected by rearing temperature.

Methods

- Southern flounder blood and sperm were swabbed to collect eggs and sperm for *in vitro* fertilization.
- Fertilized larvae were reared from a natural diet (mudcrust *A. rivieri*) to high protein pellet-based food and fed until saturation at least twice daily.
- Upon reaching a mean total length of 40 mm, the juvenile flounder were stocked at equal densities into one of three temperatures (18, 23, or 28°C) for 245 days.
- Outlets were preserved and later sectioned at 2-6 microns.
- Sex-distinguishing markers were used to distinguish males (spermatogenesis) from females (oogenesis).

Histological Analysis

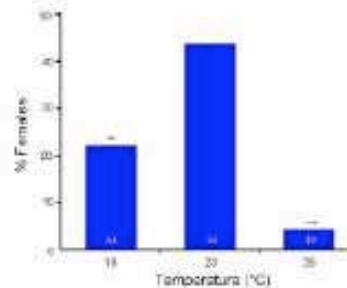


Male Differentiation



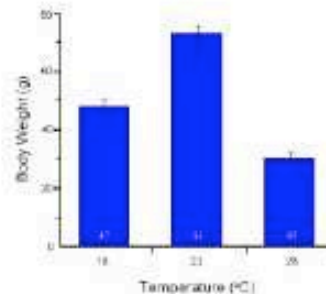
Female Differentiation

Temperature Affects Sex Determination

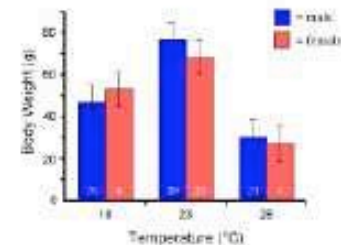


*** $P < 0.001$ and **** $P < 0.0001$ represent significant deviations from a 1:1 male:female sex ratio.

Rearing Temperature Affects Growth



Growth Does Not Differ by Sex



Results

- Sex was discernible in most fish greater than 120 mm long.
- High (28°C) temperatures produced 4% females.
- Low (18°C) temperatures produced 22% females.
- Mid-range (23°C) temperatures produced 44% females.
- Fish reared at high or low temperatures showed reduced growth compared to those at the mid-range temperature.
- Up to 245 days, no difference in growth existed between sexes.

Conclusions

- These findings indicate that sex determination in southern flounder is temperature-sensitive and temperature has a profound effect on growth.
- A mid-range rearing temperature (23°C) appears to maximize the number of females and promote better growth in young southern flounder.
- Although adult females are known to grow larger than males, no difference in growth between sexes occurred in age-0 to 1-year-old southern flounder.

Acknowledgements

The authors acknowledge the Advanced Graduate Program of the National Institute of Fisheries Science and the University of North Carolina Sea Grant College Program for funding this research. Special thanks to Lisa Strawn and Beth Strawn for help with the work.

Even better!

NC STATE UNIVERSITY



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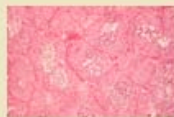
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- Southern flounder were strip spawned to collect eggs and sperm for *in vitro* fertilization.
- Hatched larvae were weaned from a natural diet to high protein diet and fed until satiation at least twice daily.
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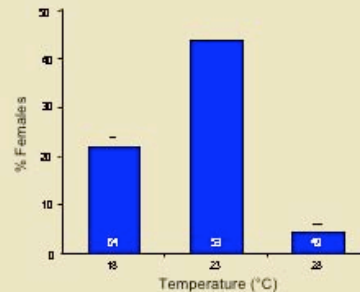


Male Differentiation



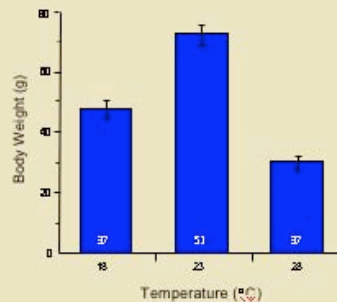
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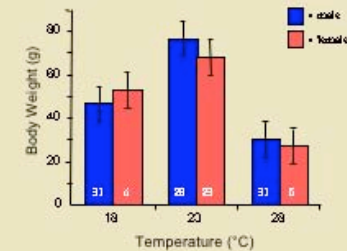


(* P < 0.01 and *** P < 0.001 represent significant differences between male and female sex ratio)

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Acknowledgements

This research was supported by the National Science Foundation (NSF) Grant IOB-0831111 and the North Carolina State University. We thank the staff of the North Carolina State University for their assistance in the laboratory.



A little different!

NC STATE UNIVERSITY

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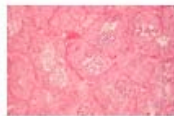
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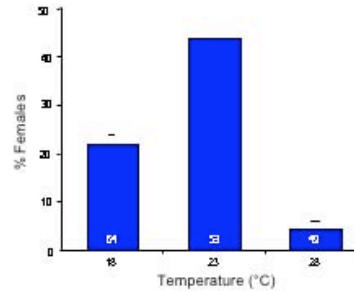


Male Gonad



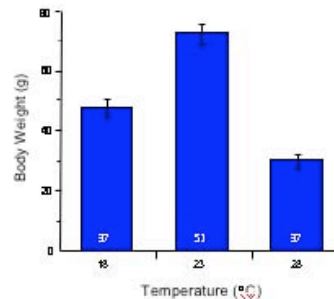
Female Gonad

Temperature Affects Sex Determination

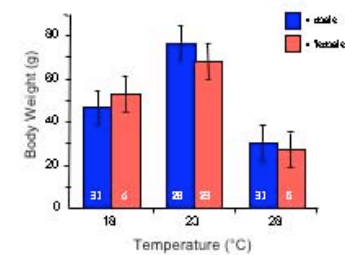


(* P < 0.01 and **** P < 0.0001 represent significant deviations from a 1:1 male:female sex ratio)

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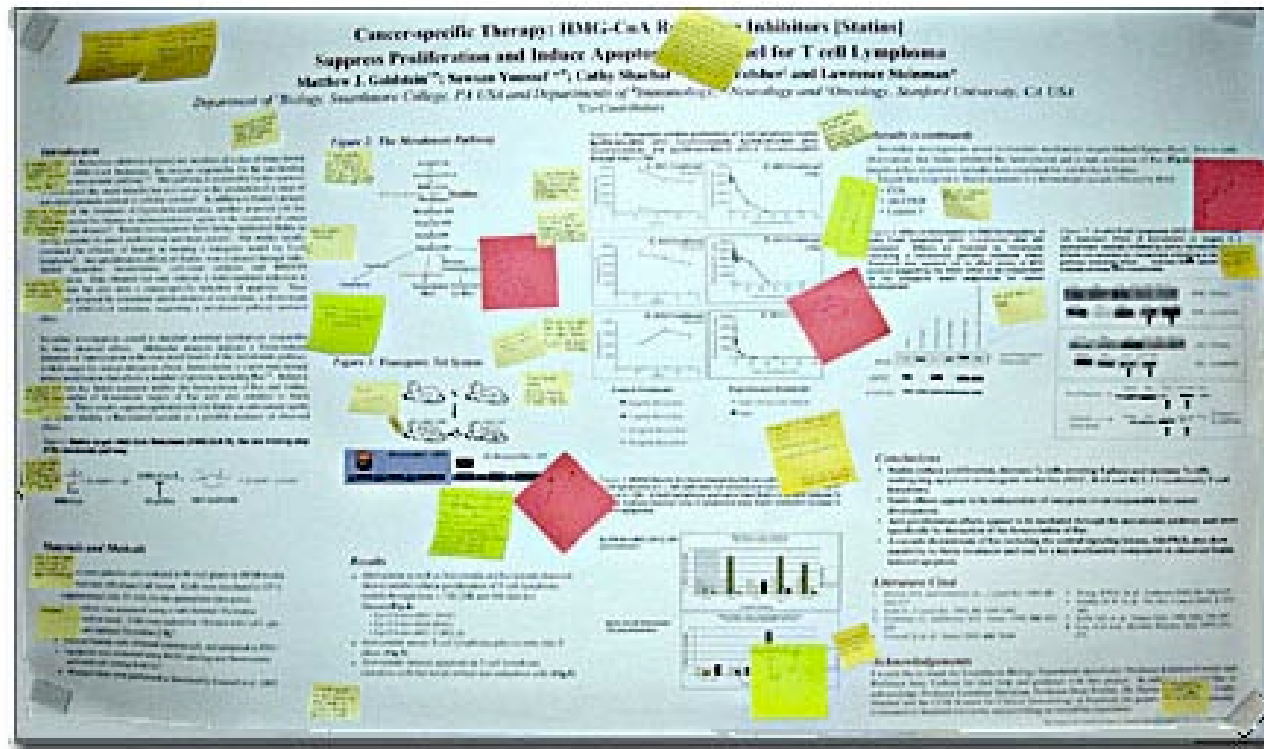
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Acknowledgements

This research was supported by the National Science Foundation (NSF) Grant #1055100. We thank the staff of the North Carolina State University Aquaculture Research Station for their assistance in conducting this research.

Edit, Edit, Edit and Evaluate!



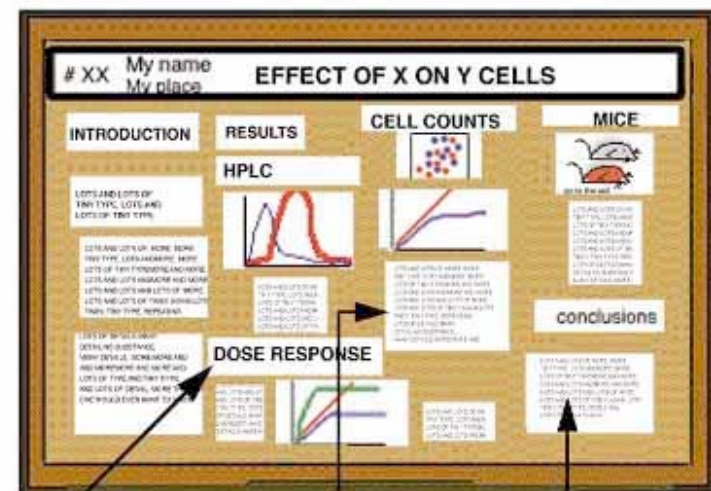
Print out a letter size draft

Can you read the type?

Are these the colors you really want?

Does it look too busy?

Do my main points pop?



Large type states methods, not results

Results artfully buried in a methods description

Carefully omits interpretations



CCMR has new poster printers!

Our wonderful computing facilities offers
state of the art poster printing



The secret of a good poster:
"Ugly layout print ugly poster"

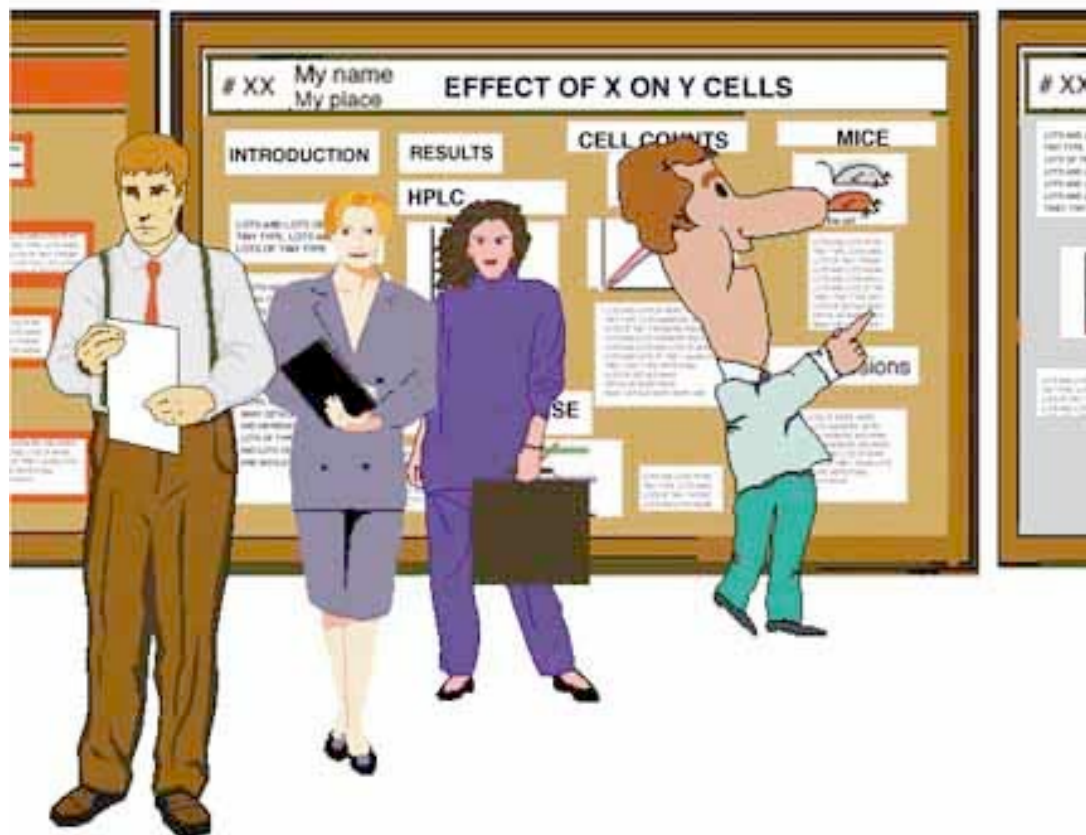
<http://cf.ccmr.cornell.edu/posters.html>



You're not done yet...

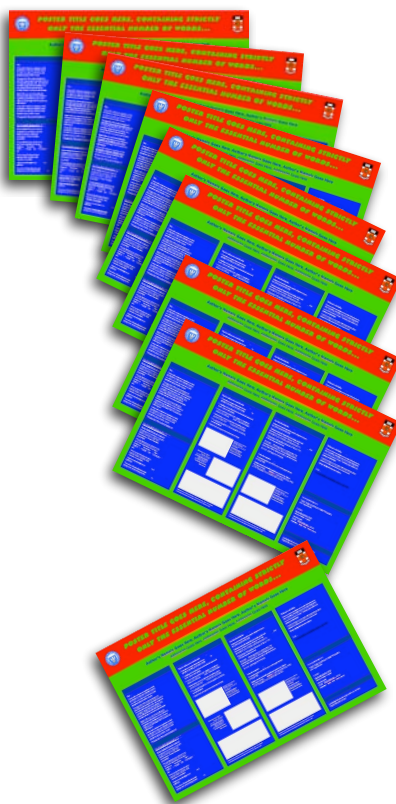
Prepare a 3-5 minute verbal explanation

Is he ever
going to
SHUT UP???





Prepare mini size poster handouts



- Provides a written record for interested folks
- Makes you look together
- Be sure to include complete contact information
- Might even get you a job!



Let's judge some designs
and see what you've learned

Using a Windbreak Habitat Model Across Broad Landscapes: The Effect of Local Landscape Composition and Geographic Location

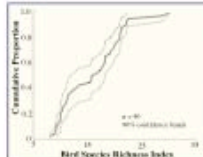
George Hess¹, John Poulsen², Raymond O'Connor³, Jeff Bay³

1. Windbreaks as Habitat

Agricultural fields — fields, pastures, and orchards — are managed to produce food and fiber for people. In the U.S. Great Plains, an extensive agricultural landscape, windbreaks have been planted to protect fields, crops, livestock, and livestock from the prevailing wind. Windbreaks provide some of the winter-wind habitat for birds and other wildlife that people draw some or other. Windbreaks make up about 25% of the wooded cover in Nebraska, much of the other wooded cover in the Great Plains states.

Although they protect soil from wind erosion and provide habitat for some species, windbreaks also contribute to the fragmentation of prairie grasslands. Prairie fragmentation negatively impacts prairie wildlife such as prairie grouse, dickcissel, upland sandpiper, and prairie falcon.

- Forty windbreaks were sampled using two-stage sampling with a frame stratified by intensity of cultivation.
- Mean length windbreaks fall in or near existing cropland.
- Habitat characteristics of each windbreak were measured in 1994.
- Thirty-five farmers allowed windbreaks to return to forest.



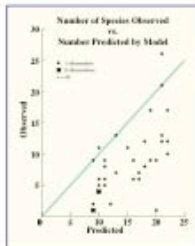
- Using regression factors associated with each sample, we estimated the habitat value of windbreaks for the region (graph left).
- We estimated that half of Nebraska's windbreaks support more than 15 breeding bird species (graph left).
- We also estimated that between 87% and 98% of windbreaks are smaller than 1.5 hectares (data not shown), suggesting that few Nebraska windbreaks provide habitat for forest interior or area sensitive birds.

4. Validating BSR Model

In 1994, a team of five ornithologists visited 40 of the 40 windbreaks 10 times (total visits) between May and early July.

Each windbreak was visited two times. Birds were collected between one half hour before and one hour after sunrise. All observed birds were identified to species and recorded using stop-netting techniques. Two hundred observations of the same species were placed on the field past through the windbreak for each visit.

Because the windbreaks were mature, we assumed all species were detected.



5. Results of Validation

The model overestimates the number of bird species in the Nebraska windbreaks (graph left). However, the relative qualitative ranking of windbreaks is generally preserved. A total of 91 species were observed.

For strong, significant relationships were found between deviation of observed from predicted number of species and any windbreak attribute or the geographic location of individual windbreaks.

Forest interior, area sensitive, and forest edge species occurred in the larger, taller, more complex windbreaks.

Openland and prairie species occurred in the smaller, shorter, less complex windbreaks.

6. Failure of the Model

There are several possible explanations for the failure of the model to predict accurately the number of bird species in the windbreaks.

- 1) Geographic differences in species richness. The model was developed in Kansas, which has 5-20 more species of bird than Nebraska (using the Bird Species Richness Index map of North America).
- 2) Differences in different windbreak characteristics. The number of species in Nebraska's windbreaks depends differently on windbreak characteristics than did the number of species in Kansas.
- 3) Differences in landscape characteristics. The number of species in Nebraska's windbreaks depends on characteristics of the surrounding landscape.

7. Local Landscape-Scale Effects

Land cover data were collected for the quarter-section (360 acres) of 100 containing the sample windbreak. Cover categories were: tree, woodland, crop, grass, herbaceous, house, low vegetation, and water. Fences and cattle grazing were also recorded (present / absent).

Landscape metrics computed included relative cover distributions, total edge length, edge : area ratio, number of patches, mean patch size, mean patch perimeter, and area of large fields.

The relation between observed and predicted number of species was not significantly related to any of the landscape metrics. This suggests that neither a region's number of species using a windbreak depends primarily on windbreak attributes.

8. Conclusions

- 1) The Bird Species Richness Index for windbreaks cannot be extended simply to describe species richness at large regional scales without either re-calibrating or adding terms that account for differences in regional species pools.
- 2) Local landscape-scale composition and structure do not explain the failure of the model.
- 3) The presence of species pools in windbreaks (e.g., forest interior, prairie) cannot be explained by windbreak size and complexity. The model may be more useful for predicting the presence or absence of species pools than for predicting the total number of species present.

Acknowledgments: This work could not have been done without the many dedicated people at the National Agricultural Statistics Service who helped plan and execute the 1994 data collection effort, the land farmers who allowed us to survey their windbreaks, the two ornithologists who spent six weeks traveling around Nebraska, and many other people from the University of Nebraska, U.S. Fish and Wildlife Service, Natural Resources Conservation Service, and the Environmental Protection Agency. Funding was provided by the Environmental Protection Agency and the USDA Agricultural Research Service.

1. North Carolina State University, Forestry Department, Raleigh, NC
2. University of Maine, Department of Wildlife Ecology, Orono, ME
3. North Carolina State University, Statistics Department, Raleigh, NC



A bit text heavy
but not too bad.



Using a Windbreak Habitat Model Across Broad Landscapes: The Effect of Local Landscape Composition and Geographic Location

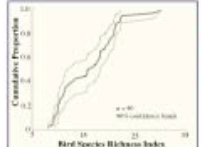
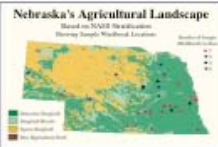
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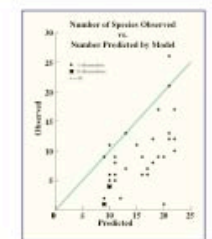
Agricultural lands — fields, pastures, and orchards — are managed to produce food and fiber for people. In the U.S. Great Plains, an extensive agricultural landscape, windbreaks have been planted to protect fields, crops, livestock, and farmsteads from the prevailing winds. Windbreaks provide some of the most essential habitat for birds and other wildlife that people have come to value. Windbreaks make up about 20% of the wooded cover in Nebraska, much of the other wooded cover occurs along riparian corridors.

Although they protect soil from wind erosion and provide habitat for some species, windbreaks also contribute to the fragmentation of prairie grasslands. Prairie fragmentation negatively impacts prairie wildlife such as prairie grouse, chickens, upland sandpipers, and peregrine falcons.

- Forty windbreaks were sampled using two-stage sampling with a frame stratified by intensity of cultivation.
- Most sample windbreaks fell in or near extensive cropland.
- Habitat characteristics of each windbreak were measured in 1994.
- Thirty-five farmers allowed windbreaks to return in 1995.



- Using regression factors associated with each sample, we estimated the habitat value of windbreaks for the region (graph left).
- We estimated that half of Nebraska's windbreaks support three times the breeding bird species (graph left).
- We also estimated that between 87% and 98% of windbreaks are smaller than 1.5 hectares (data not shown), suggesting that the Nebraska windbreaks provide habitat for forest interior or area sensitive birds.



4. Validating BSRI Model

In 1994, a team of five ornithologists revisited 55 of the 40 windbreaks (15 farmers refused further visits) between May and early July.

Each windbreak was visited four times. Data were collected between one-half hour before and one hour after sunrise. All observed birds were identified to species and recorded using spot mapping techniques. Tape recorded observations of the nearest roost and were played on the loudspeaker through the windbreak for each visit.

Because the windbreaks were narrow, we assumed all species were observed.

5. Results of Validation

The model overestimates the number of bird species in the Nebraska windbreaks (graph left). However, the relative ranking of windbreaks is generally preserved. A total of 51 species were observed.

The strong, significant relationship was found between deviation of observed from predicted number of species and size, windbreak attribute or the geographic location of individual windbreaks.

Forest interior, area sensitive, and forest edge species occurred in the larger, taller, more complex windbreaks.

Openland and grassland species occurred in the smaller, shorter, less complex windbreaks.

6. Failure of the Model

There are several possible explanations for the failure of the model to predict accurately the number of bird species in the windbreaks.

- 1) Geographic differences in species richness. The model was developed in Kansas, which has 3-20 more species of bird from Nebraska (Breeding Bird Survey's species richness map of North America).
- 2) Dependence on different windbreak characteristics. The number of species in Nebraska's windbreaks depends differently on windbreak characteristics than did the number of species in Kansas.
- 3) Dependence on landscape-scale characteristics. The number of species in Nebraska's windbreaks depends on characteristics of the surrounding landscape.

7. Local Landscape-Scale Effects

Land cover data were collected for the quarter-section (160 acres, 640 ft by 640 ft) containing the sample windbreak. Cover categories were tree, wetland, crop, grass, herbaceous, barren, non-vegetated, and water. Forest and water grazing were also recorded (open/abandoned).

Landscape metrics computed included relative cover distributions, total edge length, edge : area ratios, number of patches, mean patch size, mean perimeter per patch, and size of largest field.

The relation between observed and predicted number of species was not significantly related to any of the landscape metrics. This suggests that within a region, the number of species using a windbreak depends primarily on windbreak attributes.

8. Conclusions

- 1) The Bird Species Richness Index for windbreaks cannot be extended simply to describe species richness at large regional scales without either re-calibrating regionally or adding terms that account for differences in regional species pools.
- 2) Local landscape-scale composition and structure do not explain the failure of the model.
- 3) The presence of species pools in windbreaks (e.g., forest interior, grassland) may be explained by windbreak size and complexity. The model may be more useful for predicting the presence or absence of species pools than for predicting the total number of species present.

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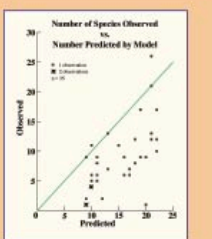
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7. Local Landscape-Scale Effects

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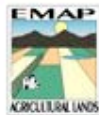
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- 2) Local landscape-scale composition and structure do not explain the failure of the model.
- 3) The presence of species pools in windbreaks (e.g., forest interior, grassland) may be explained by windbreak size and complexity. The model may be more useful for predicting the presence or absence of species pools than for predicting the total number of species present.

Acknowledgments: This work could not have been done without the many dedicated people at the National Agricultural Statistics Service who helped plan and execute the 1994 data collection effort; the land farmers who allowed us to survey their windbreaks; the five ornithologists who spent six weeks traveling around Nebraska; and many other people from the University of Nebraska, U.S. Fish and Wildlife Service, Natural Resources Conservation Service, and the Environmental Protection Agency. Funding was provided by the Environmental Protection Agency and the USDA Agricultural Research Service.

1. North Carolina State University, Forestry Department, Raleigh, NC
2. University of Maine, Department of Wildlife Ecology, Orono, ME
3. North Carolina State University, Statistics Department, Raleigh, NC



A Framework for Assessing the Condition of Agricultural Lands

George Hess¹, Anne Hellkamp², Mike Munster³, Steve Peck³, Lee Campbell⁴, Betty McQuaid⁴, Steve Shafer^{3,5}

Mission: To develop indicators of the condition of agricultural lands within an ecological framework, and to monitor and evaluate this condition on a regional basis.



Sustainable agriculture has been discussed, defined, and discussed in countless papers. Definitions tend to be broad and encompass ecological, economic, social, and even policy dimensions. Although these dimensions are interrelated, each may be treated independently. In our efforts, we sought methods to examine only the ecological aspects of sustainability.

The ecological condition of agricultural land is defined by its productivity and the degree to which natural biotic and abiotic resources are conserved and protected. Agricultural land in good condition is productive and does not compromise natural resources. Sustainability is the ability to maintain good condition over time.

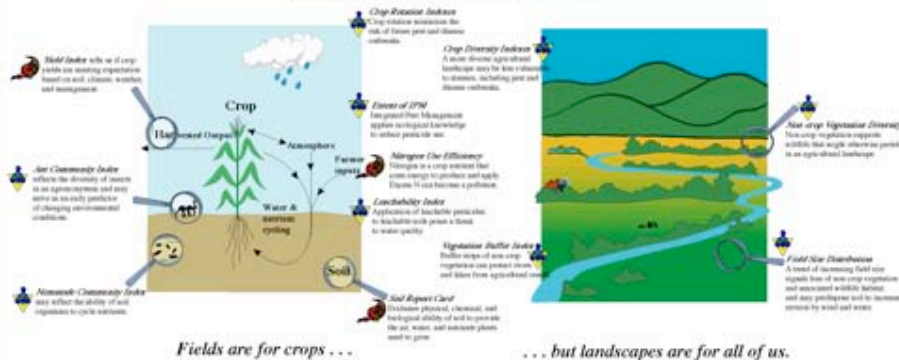


Indicators were selected to reflect crop productivity and land stewardship. In making an assessment, condition is reported for each indicator. An overall condition may also be reported, but depends critically on the relative weighting of the goals for agricultural lands. For sustainability one can examine trends in crop productivity and stewardship practices.

Potential Indicators for Annually Harvested Herbaceous Cropland

As a working guide, we chose to concentrate our efforts on developing indicators for **annually harvested herbaceous cropland** — land planted with crops that are harvested every year whether the plants are annual or perennial. Common examples are corn, wheat, soybeans, alfalfa hay, and sorghum.

We also endeavored to supplement, rather than duplicate, existing efforts. Our conceptual framework is flexible enough to incorporate indicators based on data from other monitoring efforts. For example, an erosion indicator could be developed using the USDA National Resources Conservation Service's National Resource Inventory data.



Fields are for crops . . .


. . . but landscapes are for all of us.

Acknowledgements: The EMAP Agricultural Lands Resource Group thanks the many individuals and organizations that made this effort a success. The individuals on our immediate advisory list, the organizations include the USDA's Agricultural Research Service, Forest Service, National Agricultural Statistics Service, and National Resources Conservation Service; the U.S. Environmental Protection Agency; North Carolina State University; University of Missouri; Oregon State University; University of Tennessee; and North Carolina State University. A special thank you goes to the list of organizations in purple below. Thanks to all!

1. North Carolina State University, Forestry Department, Raleigh NC;
2. Duke University Medical Center, Durham NC;
3. North Carolina State University, Department of Plant Pathology, Raleigh NC;
4. USDA National Resources Conservation Service, Raleigh NC;
5. USDA Agricultural Research Service, Raleigh NC.



Where do I begin?



PREVALENCE OF OBESITY AMONG INNER CITY LATINO CHILDREN AND ADOLESCENTS

Naam M. Mirra MD, ScD, Jill Merchant MS, Leila Baker, PhD
Children's National Medical Center and George Washington University School of Medicine and Health Sciences, Washington, DC

Background

Obesity is a major clinical and public health problem facing adolescents worldwide. In the USA, it is particularly significant in the increasing prevalence of obesity and overweight among the Latino population. Among the ethnic group there is a strong trend of health and children who are parents. Studies of the parents' health on children have been for a theoretical concept that children should be for being. Similar other factors include TV, obesity, and other related activities in adolescence, not only because of the increased health and professional care frequency, but also because when children tend to become obese adults, their obesity is associated with long chronic diseases. It will be an increasing impact on the healthcare system.

Purpose of Study

Conduct the study to assess the extent of obesity among inner city Latino children and adolescents and the overall goal of assessing the need for an obesity treatment program.

Study Design

The study was a descriptive cross-sectional study of children and adolescents aged 4 to 17 years who were randomly selected from Washington, DC's Children's Hospital's Latino Medical Clinic for the calendar year 2010. The study was an average of 50% of the parents (approximately 100%) and Latino, predominantly from El Salvador, Guatemala, and other countries. Exclusion criteria were height, weight, and physical health. Information was obtained from medical records. Study data were analyzed using statistical software and graphs. This report is a preliminary report.

Results

The descriptive data of the study is shown in Table 1. About 50% were female. The majority was 10-14 years with a total of 113 (64.4%) range of 4.1 to 15.7 years. The mean BMI was 20.8 (range 16.7 to 34.0) and a range of 1.27 to 1.91 overall BMI of the children and adolescents. The prevalence of obesity (BMI ≥ 30) was 14.2% and the prevalence of overweight (BMI ≥ 25) was 26.5% with no ethnic racial differences between the two categories. Table 2 shows that the prevalence of obesity and overweight were significantly higher for the gender differences, but not statistically significant. The prevalence of overweight was higher for youth ages 10-17 years.

Table 1 - Population statistics

Variable	Percentage (%)
Gender	50.1
Female	14.4
Age (range in years)	4.1-15.7
4-6	10.1
6-9	12.4
10-13	17.4
14-17	14.4
18-24	18.4
25-34	15.8
35-44	13.2

Table 2 - BMI Distribution

BMI Category	Percentage (%)
All BMI for overweight (BMI ≥ 25)	26.5
1. Underweight (<17)	11.4
2. Normal (17-24)	23.1
3. Overweight (25-29.9)	11.4
4. Obese (BMI ≥ 30)	11.4

Table 3 - At Risk for Overweight and Over weight for Age Category

Age Category	At Risk for Overweight (%)	Overweight (%)
4-6 y. (10%)	10.0	10.0
6-9 y. (12%)	12.0	12.0
10-13 y. (17%)	17.0	17.0
14-17 y. (14%)	14.0	14.0
18-24 y. (18%)	18.0	18.0

Conclusion & Recommendations

The prevalence of the overweight and obese for overweight among children and youth in the inner city Latino community is lower than those that have been reported. However, health care professionals should acknowledge and assess the presence of obesity and overweight in children and adolescents early and prevent appropriate management of the problem. Further research and population strategies for overweight and obesity in children and adolescents are urgently needed for the prevalence.



I'm feeling sleepy

Early Outcomes of the First 1471 Consecutive Kyphoplasty Procedures in the United States for the Fixation of Painful Osteopenic Vertebral Body Compression Fractures (VCF)

Steven R. Gartin¹, M.D., Isador H. Leiberman², M.D., Mark A. Bailey³, M.D., Joseph M. Lane⁴, M.D., Frank W. Phillips⁵, M.D., Hallett S. Mathews⁶, M.D., Hanson A. Yoon⁷, M.D., Barton H. Sachs⁸, M.D., for the Kyphoplasty Study Group
¹University of California, San Diego, Medical Center, San Diego, CA, ²Cleveland Clinic, Cleveland, OH, ³Stanford Orthopaedic Medical Group, Berkeley, CA, ⁴Hospital for Special Surgery, New York, NY, ⁵University of Chicago Spine Center, Chicago, IL, ⁶Mid-Atlantic Spine Specialists, Richmond, VA, ⁷State University of New York Health Sciences Center, Syracuse, NY, ⁸Wiley Medical Center, Albany, NY

BACKGROUND

- 700,000 VCFs per year
- 275,000 diagnosed, ~80% due to pain
- Spinal deformity associated with
 - Significant morbidity
 - 25% increased mortality (Med, Ann Int Med 1999)
- Current treatments ineffective
 - Open surgery fail
 - Medical management palliative
- Vertebroplasty
 - Bilateral transpedicular cement fill
 - Relieves pain
 - Requires high pressure and runny cement
 - High risk of cement leaks
 - Up to 73% where documented (Weil et al., Radiology 1997)
 - Major complications (Chiras, J Int Neurosurg 1997)
 - 1.3% in osteoporosis
 - 50% in metastatic cancers

KYPHOPLASTY

Kyphoplasty is a minimally invasive orthopedic procedure for reducing and fixing painful vertebral body compression fractures secondary to osteoporosis. Using a posterior approach, one or two inflatable Bone Tamps (Fig. 1) are inserted into the fractured vertebral body, generally using a bilateral transpedicular approach (Fig. 2). The surgeon carefully inflates the balloon tamps (Fig. 2) using radiographic contrast medium with image, volume and pressure control. The increased balloon tamp volume compacts the inner cancellous bone as it pushes the fractured outer cortical bone back toward its normal position. The inflation path is also controlled by placement, volume and balloon design. After reduction, the balloon tamp is removed, and the resulting void is filled with thick PMMA under low manual control and low pressure. The steps of Kyphoplasty are illustrated in Fig. 3.

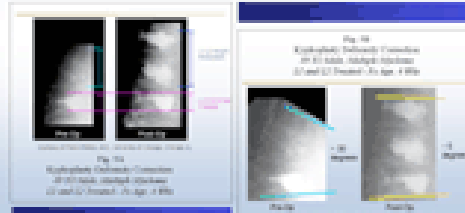
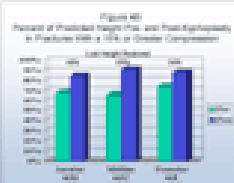


OK, but which way do I go?

STUDY DESIGN AND METHODS

A retrospective multi-center review to assess early outcomes with Kyphoplasty. Pain was localized by physical examination. The presence of fracture deformity and collapse was confirmed on MRI. General or deep local anesthesia was chosen based on anatomy, number of levels and patient status. The first 125 patients at our centers were asked to characterize their back pain as improved, the same or worse 24 hours post-op and at final follow-up. Fractured and nearest normal vertebral body heights were measured anterior, middle and posterior in the first 27 vertebral body fractures treated by one surgeon (MAM). The height of the nearest normal vertebral body was used to calculate the % of predicted height for all the vertebral bodies (Fig. 4A) and for the sub-set where which had lost 15% or more of height before treatment (Fig. 4B).

The pre-treatment height was subtracted from the predicted height, then divided by the post-treatment height subtracted from the predicted height, to find the percentage of total height restored. One set of X-rays by one surgeon (JMP) are used to show an example height restoration (Fig. 5A) and deformity correction (Fig. 5B). Device-related major complications from all procedures are reported. Minor leaks in the first 70 procedures performed by one surgeon (JL) were assessed with X-ray and MRI.



PRELIMINARY RESULTS

- 100% fracture (acute table 1)
- Average (range) 4 (range) 1-6 weeks
- Range 10 days-1 year
- 90% complete
- 100% fracture (acute table 1)
- Average reduction 1.1
- Average fracture position 150 (range 80-210)
- Average tamp inflation volume 1.0 (range 1-1.6)
- Mean final VFA expansion rate 10%
- Minor leaks
- 97% report pain improvement at 1 week
- 97% VFA reduction of fracture (Fig. 4A, B, 5A, B)
- No increased incidence of adjacent fracture
- 100% acute vertebral body complications
 - 1 kyphoplasty
 - 1 fracture
 - 1 fracture
 - 1 kyphoplasty
- 0% acute leak (during tamper removal)

CONCLUSIONS

Kyphoplasty is an important treatment option that provides immediate mobility and return to activities of daily living to patients with acutely painful vertebral body compression fractures secondary to osteoporosis. Kyphoplasty facilitates fracture reduction and deformity correction. While reduction is more likely in acute fractures (less than 6 weeks or less), it has been seen in fractures over one year old. Kyphoplasty also provides rapid pain relief in the nearly all patients, and this result is independent of fracture reduction. The safety profile of Kyphoplasty compares favorably to the published safety profile of vertebroplasty.



Poster title goes here, containing strictly only the essential number of words...



Author's Name/s Goes Here, Author's Name/s Goes Here, Author's Name/s Goes Here

Address/es Goes Here, Address/es Goes Here, Address/es Goes Here

Introduction

Fit ...
 Check with conference organizers on their specifications of board dimensions before you start your poster (e.g., most posters are landscape format for easier viewing).
 The page size of the poster template is A0 (36" x 60") in landscape (horizontal) format. Do not change the page size. You can scale it to a smaller or larger size when printing, but you need a different setup with either a portrait (vertical) or a square poster template.
 Bear in mind you do not need to fill up the wide space allocated by some conference organizers (e.g., 80" wide in the US). Do not make your poster bigger than necessary (and it's a pain to carry).

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How to use the poster template ...
 Simply highlight the text and replace it by typing in your own text or copy and paste your text from a MS Word document or a Power Point slide presentation.
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Method

Tips for making a successful poster ...

- Re-write your paper in poster format. It is simply a writing style and not a font.
- Headings other than Section Headers should be both upper and lower case initial capitals.
- Use a serif font for section headers and a sans-serif font for body text.
- When laying out your poster leave breathing space around your text. Don't overcrowd your poster.
- Try using photographs or colour graphics. Avoiding mathematical symbols.
- Spell check and get someone else to proof read.



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 Images such as photographs, graphs, diagrams, logos, etc., can be added to the poster.
 To make some images fit your poster go through the menu and follow the steps: Format > Font > Font Effects > your computer, select and press OK.
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 Do not use images from the web.

How to save graphics ...
 For simple graphics use MS Word or other graphics software in Power Point.

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Conclusion

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Acknowledgements

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Perfect!

A Large-Scale Public Library Renovation in Taiwan

A Large-Scale Public Library Renovation in Taiwan

**Library Association of E.O.C.
National Taichung Library of Taiwan**

ABSTRACT

There are 323 public libraries, including city, county, and village public libraries, in Taiwan. As a result of the 1990s, they are not fit in the digital environment for user needs.

In order to upgrade the quality of public library services in Taiwan to meet user needs and to build lifelong learning, in 2003, the central government of Taiwan approved a budget of NT\$1.2 billion (US\$ 4 million) as a large-scale public library renovation project in 323 public libraries.

National Taichung Library was designated as coordinate library to execute the project from February 2003 to June 2004. 323 public libraries were divided into eight groups according to the geographical areas, and a steering committee was formed, consisting of committee members from the fields of library and information science, architecture, space design, structure, and history. By committee members were assigned to one of eight groups of 323 public libraries to help and to give suggestions of renovation, improvement, replacement, service programs of each library.

The project was executed and completed efficiently and effectively in June 2004. This poster presentation will display the results of the renovation, improvement, replacement, library management, and services of 323 public libraries in Taiwan. The contents of the poster will be explained by words, pictures, and statistical tables.

Keyword: Public libraries
<http://www.ntl.gov.tw>

Background

For last three years, many public libraries in Taiwan have been renovated or replaced. However, the quality of public library services is still not satisfactory. In order to upgrade the quality of public library services in Taiwan to meet user needs and to build lifelong learning, in 2003, the central government of Taiwan approved a budget of NT\$1.2 billion (US\$ 4 million) as a large-scale public library renovation project in 323 public libraries.

Figure 1: Statistical of Public Libraries in Taiwan

Category	Number	Area	Area	Area	Area	Area
Total	323	100%	100%	100%	100%	100%



Objectives

1. Upgrade the quality of public library services in Taiwan to meet user needs and to build lifelong learning.

2. Upgrade the quality of public library services in Taiwan to meet user needs and to build lifelong learning.

3. Upgrade the quality of public library services in Taiwan to meet user needs and to build lifelong learning.

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9. Upgrade the quality of public library services in Taiwan to meet user needs and to build lifelong learning.

10. Upgrade the quality of public library services in Taiwan to meet user needs and to build lifelong learning.



www.ntl.gov.tw



Oh my gawd!

WHICH IS MORE IMPORTANT: NUMBER OF PATCHES OR CONNECTIVITY?

Darm Kalisak, PES Student

Contact: ddk2@cornell.edu

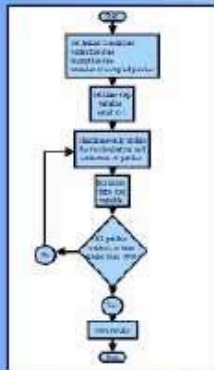
INTRODUCTION AND OBJECTIVES

Many people consider the number of patches as the most important factor of a network. However, the connectivity of the network is also very important. The connectivity of a network is the number of connections between the patches. The connectivity of a network is also very important. The connectivity of a network is also very important.

The connectivity of a network is also very important. The connectivity of a network is also very important. The connectivity of a network is also very important.

The connectivity of a network is also very important. The connectivity of a network is also very important. The connectivity of a network is also very important.

THE PROGRAM



ASSUMPTIONS AND LIMITATIONS

The number of patches is assumed to be constant. The connectivity of the network is assumed to be constant.

The connectivity of the network is assumed to be constant. The connectivity of the network is assumed to be constant.

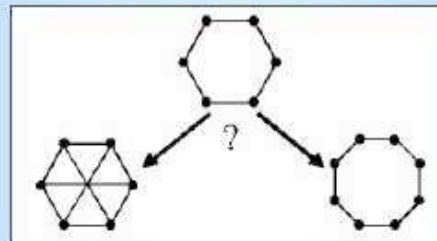
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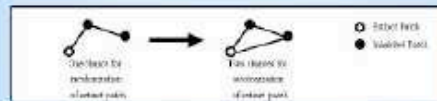
THE ISSUE



A network topology is a collection of discrete population patches, in which individual patches vary typically in size, shape and location. In the long-term stability of the network topology is largely driven by adding new patches or by increasing the number of migration pathways between existing patches.

Adding patches increases the overall population of the network, and increases its total extinction rate, likely by increasing the direct number of patches which would have to go extinct.

Adding migration pathways may increase the likelihood of recolonization of extinct patches, by giving extinct patches more routes for immigration.

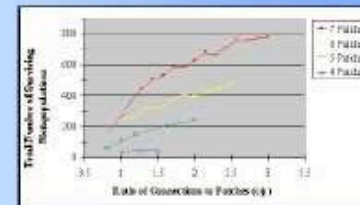


RESULTS

Results of the study by using the model which involves the parameters:

- number of patches (from 4, 5, 6, and 7)
- stability constant (assumed constant)
- the ratio of migration pathways to number of patches (ratio)
- the extinction rate (assumed constant)

The overall stability of the network is determined by the number of patches and the connectivity of the network. The overall stability of the network is determined by the number of patches and the connectivity of the network.



CONCLUSIONS

The number of the total patches that, when possible, adds patches to a population is the population. The number of the total patches that, when possible, adds patches to a population is the population.

The number of the total patches that, when possible, adds patches to a population is the population. The number of the total patches that, when possible, adds patches to a population is the population.



Nice flow, but too metallic

Fusing ¹⁸F-FDG-hybrid PET To CT Images Significantly Alters Treatment Planning In The Radical Treatment Of Non-Small Cell Lung Carcinoma

Y.C. Ung, M.D., C.B. Caldwell, Ph.D.,¹ K. Mah, M.Sc., C.J. Dunjovc, M.D., J.M. Halsegh, M.D., S.N. Ganguli, M.D.,¹ R.O. Tiroca, B.Sc., and L.E. Ehrlich, M.D.¹
 Toronto-Sunnybrook Regional Cancer Centre, Sunnybrook and Women's College Health Sciences Centre,¹ and University of Toronto, Toronto, CANADA



Abstract

A prospective clinical trial was conducted to determine the impact of integrating PET information into treatment planning for radical treatment of non-small cell lung carcinoma. Twenty-two patients were treated with radical resection and/or radiation therapy. PET-CT scans were obtained for all patients. PET-CT scans were used to identify areas of increased metabolic activity that were not visible on CT scans. The presence of PET-CT positive areas was used to modify the treatment plan. The impact of PET-CT on treatment planning was assessed. PET-CT scans were used to identify areas of increased metabolic activity that were not visible on CT scans. The presence of PET-CT positive areas was used to modify the treatment plan. The impact of PET-CT on treatment planning was assessed.

Potential of ¹⁸F-FDG-hybrid PET for Radiation Therapy Planning

"Fluoro-deoxyglucose (FDG) is a glucose analogue that is metabolically trapped in cells. Many malignant tumours are associated with increased glycolysis and thus demonstrate increased uptake of FDG. In lung cancer staging, FDG-PET has proven to have greater sensitivity and specificity than CT in radiation planning. It may help to distinguish between first and second primary nodules and reduce the risk of under-treating nodules. FDG-PET may complement the standard CT-based plan."



Figure 1. PET-CT reveals focal FDG uptake, which indicates a second primary nodule. Areas of focal uptake are noted on the PET and CT, respectively.

Study Objective: To determine the impact of integrating ¹⁸F-FDG-hybrid PET images with CT planning images on treatment planning of patients with NSCLC.

Problem

Local control with radical resection therapy for non-small cell lung carcinoma (NSCLC) is often poor. Some escalation with SBRT for the potential to improve outcomes. The treatment plan, with any dose escalation approach to the ability to accurately define the gross tumour volume (GTV). To do systematic imaging techniques such as PET or MRI. It is often difficult to distinguish nodules from normal tissue, particularly when nodules are peripherally located. CT and MRI are also well suited to the determination of any metastatic lymph nodes are involved. A standard care approach to lymph node involvement would help guide treatment strategies.

Prospective Study Design

Imaging: In treatment position and same day

- FDG-hybrid PET**
- Minimum 4 hour fast prior
 - 4 - 10 mCi ¹⁸F-FDG injected
 - Image 1 hour 1 hour's PET-CT scan
 - Repeat PET scans
 - 10 - 15 min high respiratory suspension
 - Repeat scan 10-15 min later

- CT simulation**
- Right and left breast
 - Repeat CT scan 10
 - Repeat CT with new chest
 - Reduce and treat with other means
 - Repeat the CT at 10-15 min

Image Registration

The CT and PET-CT scans were co-registered using a 3D rigid body registration routine program and eight fiducial markers. All registrations achieved a composite deviation of less than 1 mm.

Patient Selection

- confirmed for radical resection therapy
- able to be in treatment position for CT simulation
- operable for advanced consent
- preclinical selection for post-operative assessment on diagnostic CT

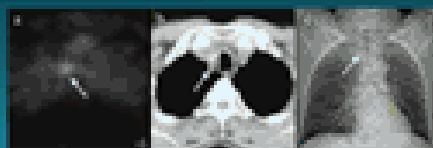
Treatment Planning

- PET-CT based using CT only and then with PET-CT by each RT physician
- Separate plans generated for CT based PET-CT and CT-PET based PET-CT
- AP-PA, RAR, LA, RL, and other views based on PET-CT to the treatment plan
- Final dose submitted for RT by CT-RT generated for PET-CT and used

Impact of FDG-hybrid PET on Patient Management

- In 102 (49%) patients, radiation therapy was changed from radical to palliative intent.

Figure 2. Case example where therapy was changed from radical to palliative intent because of the diagnosis of second primary lung cancer. PET-CT scans show a second primary nodule (arrow) not seen on CT. The second primary nodule was of giant stage during PET-CT and PET-CT-based plans based on PET-CT.



Impact of Co-registered PET-CT on PTV Coverage

- In 102 (49%) patients, the volume of PTV_{95%} receiving at least 95% of the prescribed dose with the CT only based plan was less than 95%.

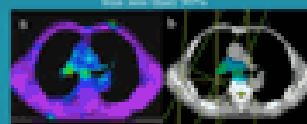


Figure 3. Case example to define and describe the difference between PTV_{95%} volumes. In PET-CT based with CT simulation, the PTV_{95%} volume was increased on PET-CT scans compared to CT only based plan. The observed increase in PTV_{95%} volume was 10% of the prescribed dose. Without PET-CT data, only 70% of the CT-PET based PTV_{95%} volume received a dose of 95% of the prescribed dose.

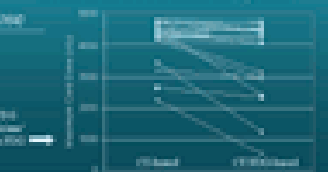


Figure 4. Coverage of PTV_{95%} based on PET-CT integration. The results on the coverage of PTV_{95%} in 102 cases show that 45% of the PET-CT based PTV_{95%} volume received a dose of 95% of the prescribed dose. In 55 cases, the minimum dose in the PTV_{95%} volume was less than 95% of the prescribed dose (right column).

Impact of FDG-hybrid PET on Spinal Cord Dose

- In 102 (49%) cases, the maximum cord dose was reduced by more than 200 cGy with PET-CT data.

Figure 5. The maximum dose to the spinal cord in the CT only and CT-PET plans was shown for evaluation. The results on the average of the maximum dose to the spinal cord in 102 cases show that 50% of the maximum dose to the spinal cord was reduced by more than 200 cGy with PET-CT data.



Discussion

The impact of integrating PET-CT scans into treatment planning was assessed in terms of patient management, PTV coverage, and maximum dose received. PET-CT scans were used to identify areas of increased metabolic activity that were not visible on CT scans. The presence of PET-CT positive areas was used to modify the treatment plan. The impact of PET-CT on treatment planning was assessed. PET-CT scans were used to identify areas of increased metabolic activity that were not visible on CT scans. The presence of PET-CT positive areas was used to modify the treatment plan. The impact of PET-CT on treatment planning was assessed.

Conclusions

The timing of PET-CT before PET images in CT planning images significantly altered treatment plans in 49% of our cases. Integration of PET-CT before PET scans before planning increases the probability of more radical resection and therefore a subsequent step in SBRT for lung cancer.

References

1. Ung YC, et al. The impact of PET-CT scans on treatment planning for radical resection and radiation therapy in non-small cell lung carcinoma. *Int J Radiat Oncol Biol Phys*. 2010;77:100-105.
2. Mah K, et al. The impact of PET-CT scans on treatment planning for radical resection and radiation therapy in non-small cell lung carcinoma. *Int J Radiat Oncol Biol Phys*. 2010;77:100-105.

Author disclosures of potential conflicts of interest and author contributions are found at the end of this article.



I've fallen,
and I can't get up



Your Ingenious Teaser Right Here to Woo Them Down to the Body

Thema of the authors 23pt regular

Conclusions first: 44 pt bold

Always put the most important part - your conclusions - first! Place your conclusions in the upper left hand corner of your poster.
Prepare your material from the reader's perspective. What was done, by who and your conclusion has to be understood within a couple of second's reading! Use active voice when writing the text. **textsize:: 34 pt regular**

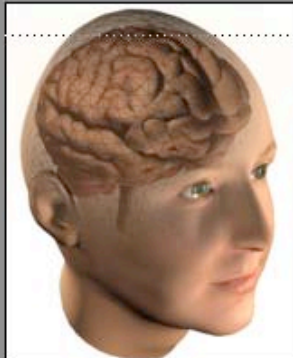


Illustration of Karolinska
Imagecaption 23pt regular

Introduction

Posters are primarily visual presentations. Your poster should be dominated by self-explanatory illustrations such as graphs and pictures while the amount of text should be kept to the minimum.

Your aim

Your poster is an advertisement for your research and as such it needs to be eye-catching and straight to the point. You only have seconds, or at best a few minutes to attract the attention of the visitor to a poster session. Keep your message short and clear

Your message

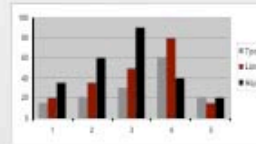
Keep your message clear and your text concise. Decide what is relevant for this poster and try to get your message across to your target group.

Layout, photos and print

Contact [Mediahuset](#) at University Library for help with layout and image enhancement. For printouts and professional photographers contact [Bildmakarna](#). For more information: www.bildmakarna.kth.ki.se



Always write a descriptive caption 23pt regular



Always write a descriptive caption 23pt regular

Tips:

The best font for text blocks that are as short as they should be on a poster is a Sans Serif typeface family. Therefore, use sans serif fonts such as Arial or ~~Verdana~~ sans rather than serif fonts like Times or Courier.
AVOID CAPITAL LETTERS IN TEXTS THAT ARE LONGER THAN ONE LINE, SINCE THEY ARE MORE DIFFICULT TO READ.

Handouts

If you succeed in getting the reader's attention, provide her/him with more detailed information in the form of handouts or printed articles. Include references on your handout instead of your poster.

It is always nice to put in a picture and write some few short notes of what's going on in the future. Put handouts, business cards, nearby - on a table or in an envelope hung with the poster.



Gorgeous!



LESSONS LEARNED FROM AIRWAY PRESSURE RELEASE VENTILATION (APRV)

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INTRODUCTION

Airway Pressure Release Ventilation (APRV, aka. BiPAP) has been previously demonstrated to be a useful modality to maintain patients with acute lung injury (ALI) or the acute respiratory distress syndrome (ARDS). As this is a fundamentally different mode than conventional cyclic (tidal) ventilation, we conducted a single institution's experience with APRV to determine safety, complication detection, and efficacy, at resolving hypoxemia and hypercarbia.

METHODS

Consecutive patients transitioned from either volume or pressure targeted ventilation to APRV (Dräger Esol4 Pulmonary Workstation) at a University hospital surgical ICU were retrospectively reviewed. Patients initially ventilated with APRV were excluded. Initial APRV settings to correct hypoxemia ($pO_2 \leq 60$ torr vs $FiO_2 \geq 0.5$) were a P_{high} at the prior plateau pressure, a T_{high} of 6.0 sec and a T_{low} of 0.8 sec. Hypercarbia ($pCO_2 \geq 55$ torr and $pH \leq 7.2$) patients were set to a T_{high} of 5.0 sec and a T_{low} of 1.0 sec. Settings were adjusted to resolve hypoxemia and hypercarbia. IRB approved abstracted data included principal diagnoses, ventilation parameters, laboratory values and ventilator associated complications. Data before and after APRV were compared using a two-tailed paired t-test or Chi-square as appropriate; significance was assumed for $p < 0.05$.

RESULTS

Demographics

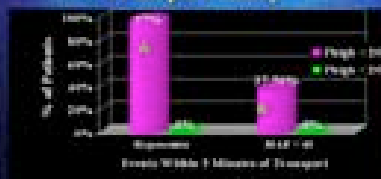


APRV

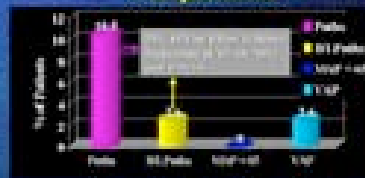


Element	Value
% Hypoxemia	88%
% Hypercarbia	12%
Time to $SpO_2 \geq 92\%$	7 ± 4 min
Time to $EtCO_2 \leq 6.8$	5.2 ± 0.9 hr
Time to $pCO_2 \leq 40$ torr	42 ± 7 min
Time to norm pCO_2	76 ± 12 min
Mean change in V_T	-0.2 ± 0.1 L/min ²

Transport Safety



Complications



CONCLUSIONS

1. APRV is a safe rescue mode for hypoxemic or hypercarbic respiratory failure and requires a significantly lower V_T than conventional ventilation.
2. Decreasing release phase volumes and a rising pCO_2 are strong indicators of pneumothorax in a patient on APRV. Routine end-tidal CO_2 monitoring is recommended.
3. Preparation for safe intra-hospital transport may be keyed to the F_{high} required for oxygenation and ventilation. Patients requiring a $F_{high} > 20$ cm H_2O should be transported on the ventilator.



Welcome to
the 80's
Fer sure!



Poster title goes here, containing strictly only the essential number of words...



Author's Name/s Goes Here, Author's Name/s Goes Here, Author's Name/s Goes Here

Address/es Goes Here, Address/es Goes Here, Address/es Goes Here



Introduction

File

Check all contents against the publication of the an abstract, tables, and supporting materials providing landscape, post, or slide.

The page should be prepared in a standard size. Do not change the page size. If it is necessary to change the page size, you must adjust the margins and the font size of all text and graphics.

Do not use a color font or a color background for the text. Do not use a color font or a color background for the text. Do not use a color font or a color background for the text.

Aim

It is possible to provide a clear and concise statement of the aim of your research. This should be done in a clear and concise manner. The aim should be stated in a clear and concise manner. The aim should be stated in a clear and concise manner. The aim should be stated in a clear and concise manner.

Methods

- The following are the methods used in this study:
- The use of a standard method for the analysis of the data.
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Results

Images and Graphics

Images and graphics should be used to illustrate the results of the study. They should be used to illustrate the results of the study. They should be used to illustrate the results of the study. They should be used to illustrate the results of the study.

How to use graphs

For single graphs use the following format: Graph of Y vs X. For multiple graphs use the following format: Graphs of Y vs X and Z vs X.



Findings and Conclusions

Check the findings and conclusions against the publication of the an abstract, tables, and supporting materials providing landscape, post, or slide.

Code

For providing the findings and conclusions, use the following format: Findings and Conclusions.



Conclusion

The following are the conclusions of this study:

Contact

Medical Research Unit
 Prince of Wales Hospital
 7000-7000
 7000-7000
 7000-7000

Acknowledgements

The following are the acknowledgements of this study:



This works!



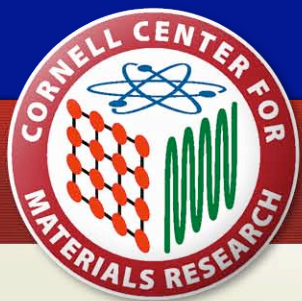
Helpful sites on poster presentations:

<http://www.ncsu.edu/project/posters/IndexStart.html>

<http://www.swarthmore.edu/NatSci/cpurrrin1/posteradvice.htm>

LiLynn Graves

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