

# Scientific Poster Design

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





# A poster can be better than giving a talk

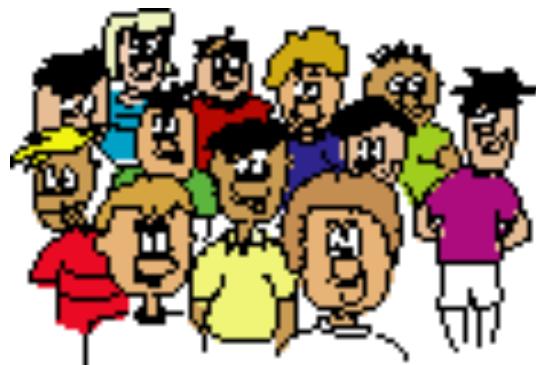
More efficient because:

- 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...

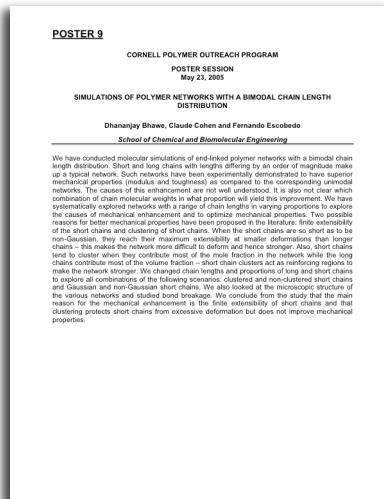
An advertisement of your hard work



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**  
For ...  
Check with conference organizers on their specifications of size and orientation before you send out your poster.  
Remember to use a presentation software.  
The suggested Microsoft template (MS Word, 1000x1000), landscape format, document page size (A4) can scale down to a smaller or larger size when printing. You need a different paper with either a portrait (vertical) or a landscape paper template.

Bar in the top you can use a full page header space allocated by some conference organizers (e.g. Sustech in US). Don't make your poster bigger than necessary because it will cost extra.

**Method**  
For making a successful poster ...  

- Rewrite your paper in poster format ...
- Simply everything and do less text.
- Making sure that all figures should be in upper and lower case letters.
- Have now headings in capitals or use them in bold characters instead.
- When writing on your poster leave breathing space around you text. Don't overcrowd your poster.
- Try using photographs or colour graphics. Avoiding numerical tables.
- Spared check your grammar and punctuation.

**Results**  
Reporting files ...  
Images such as photographs, graphs, diagrams, logos, etc. can be saved as separate files.  
To print your images in your poster go through the following steps: Open your image from MS Word and save it on your computer as JPEG or TIFF, JPEG is preferred.  
Because of the high resolution of images (e.g. 1000x1000 pixels), it will be about 3MB (1400x1050 pixels) to about 10MB (1600x1200 pixels). Call MS Publisher.  
Do not forget to save the files.

**Conclusion**  
For more information:  
Poster Design (Scanning and Digital Photography and Image Editing).

**Acknowledgements**  
Just right place to place with your own.  
Replace this with your text.

**Printing and Lamination**  
Once you have completed your poster bring it known to MSU for printing. We will provide a free color print of your poster and postcard. Then the poster will be printed and laminated.  
From Monday to Friday you can drop off your poster to the printing unit between 8:00 am and 4:00 pm.  
Simply highlight the place.

**Cost ...**  
For poster printing and lamination charges contact MSU.



# 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.

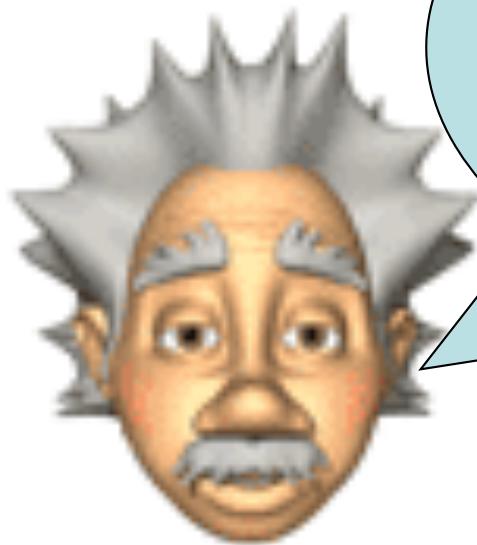
# How do I get months and years of research onto my poster?



- 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

The image shows a template for a research poster. At the top center, it says "Your First Chance to Capture Your Audience and Make Them Want to Check Out Your Stuff". Below that is the author information "T. Farra<sup>1</sup>, M. Jacisin<sup>2</sup>" and the institutions "<sup>1</sup>Brigham and Womens Hospital, <sup>2</sup>New England College of Optometry, Boston, MA". The poster is divided into sections: "Introduction", "Methods", "Results - con't", "Results - con't", "Discussion", "Purpose", "Results", "Conclusions", "Sample", and "References". Each section is represented by a horizontal bar.



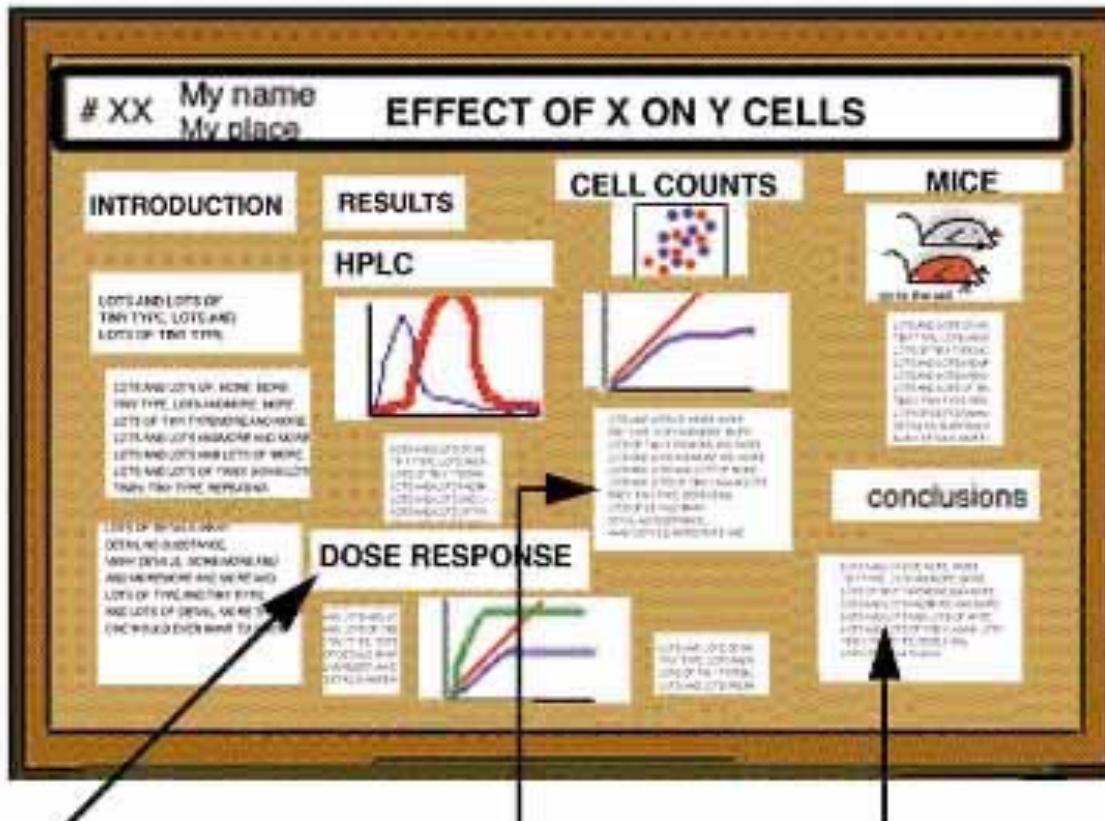
Find out the size required!

# Who's my audience?





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



Large type  
states methods,  
not results

Results  
artfully buried in a  
methods description

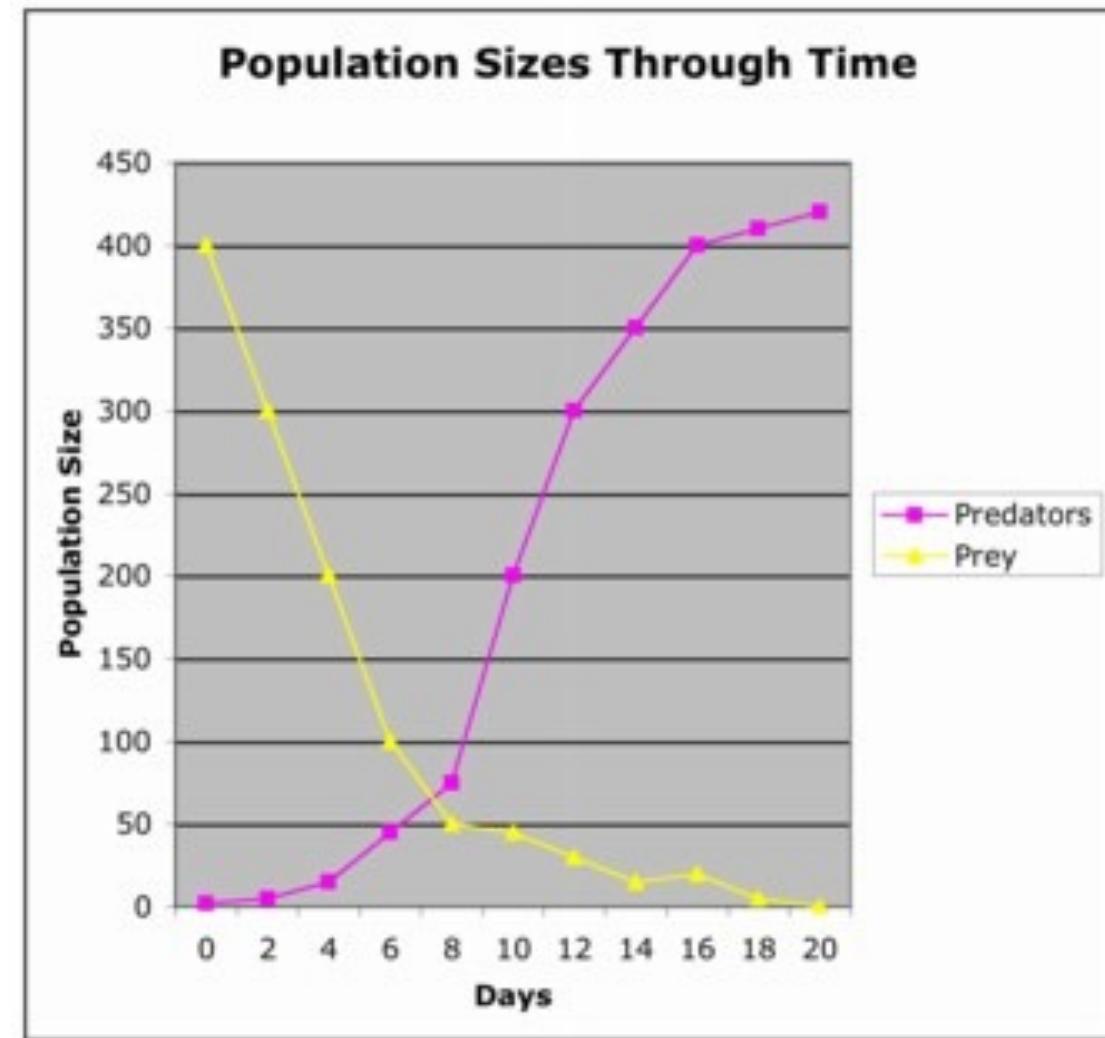
Carefully  
omits  
interpretations

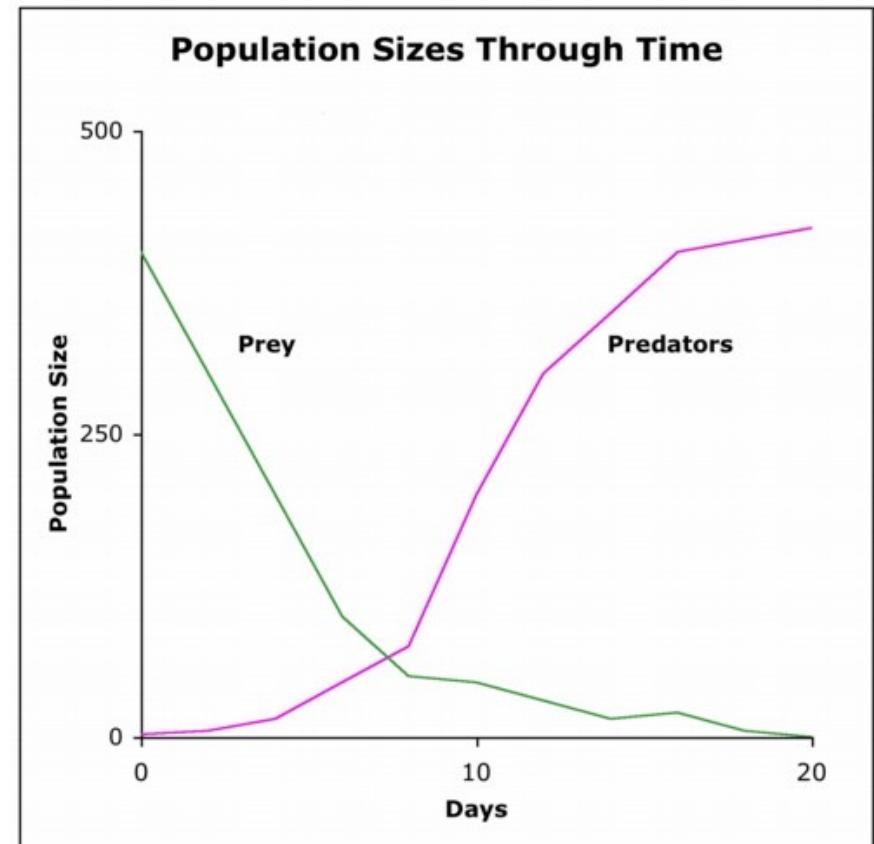
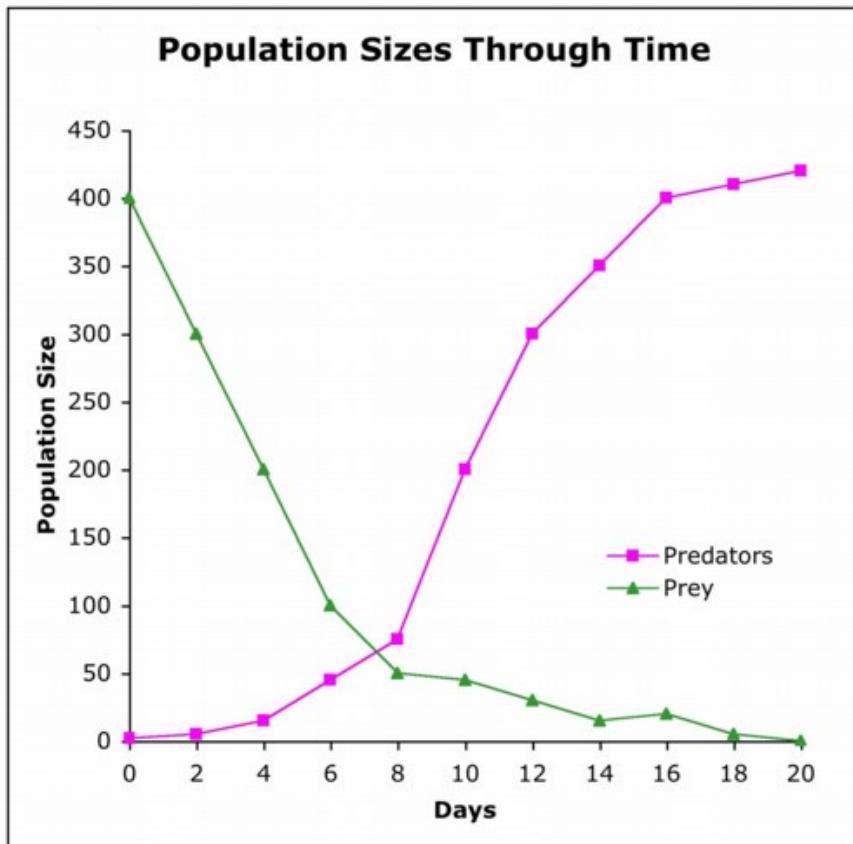


Start putting  
together your  
2 main elements

## 1) Simple, effective data displays

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

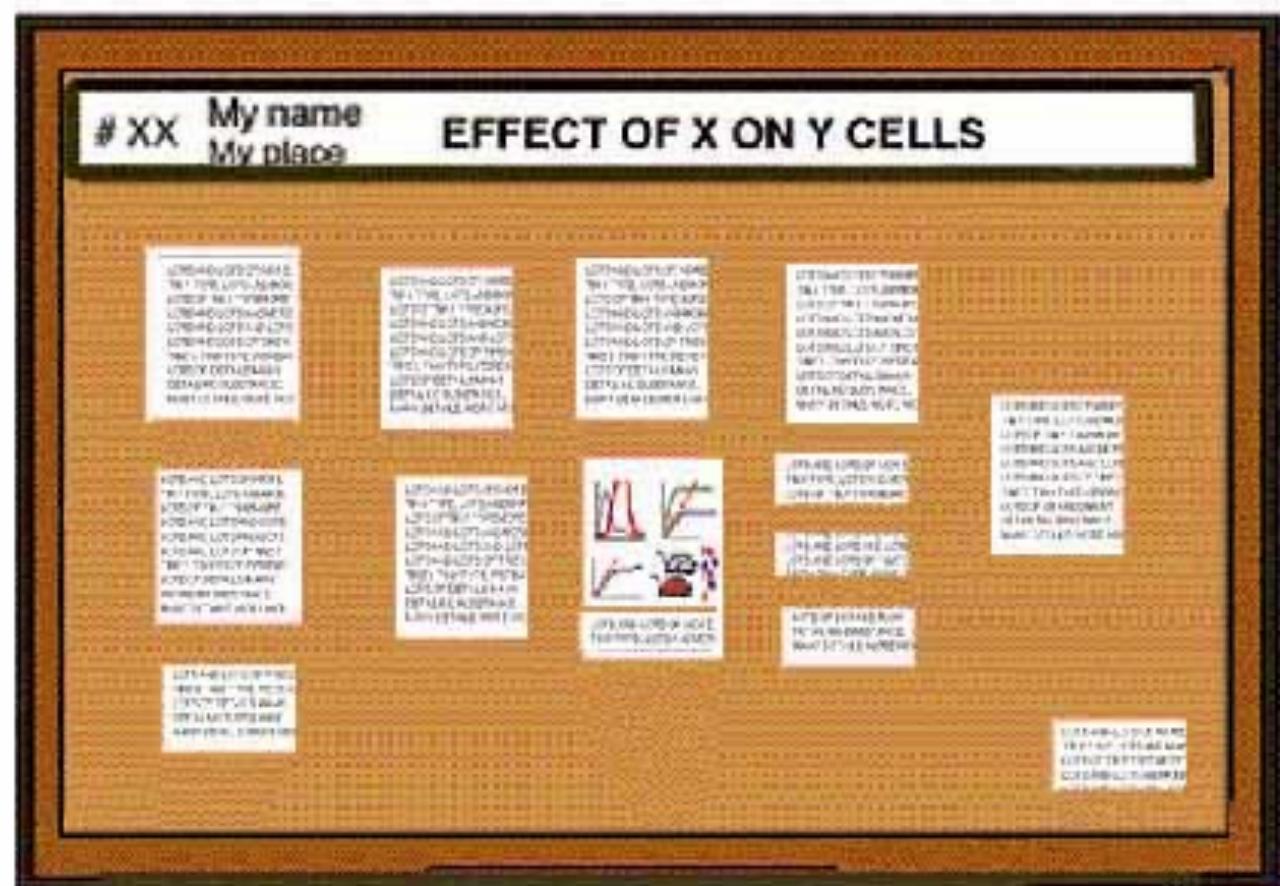






## 2) Small blocks of supporting text

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

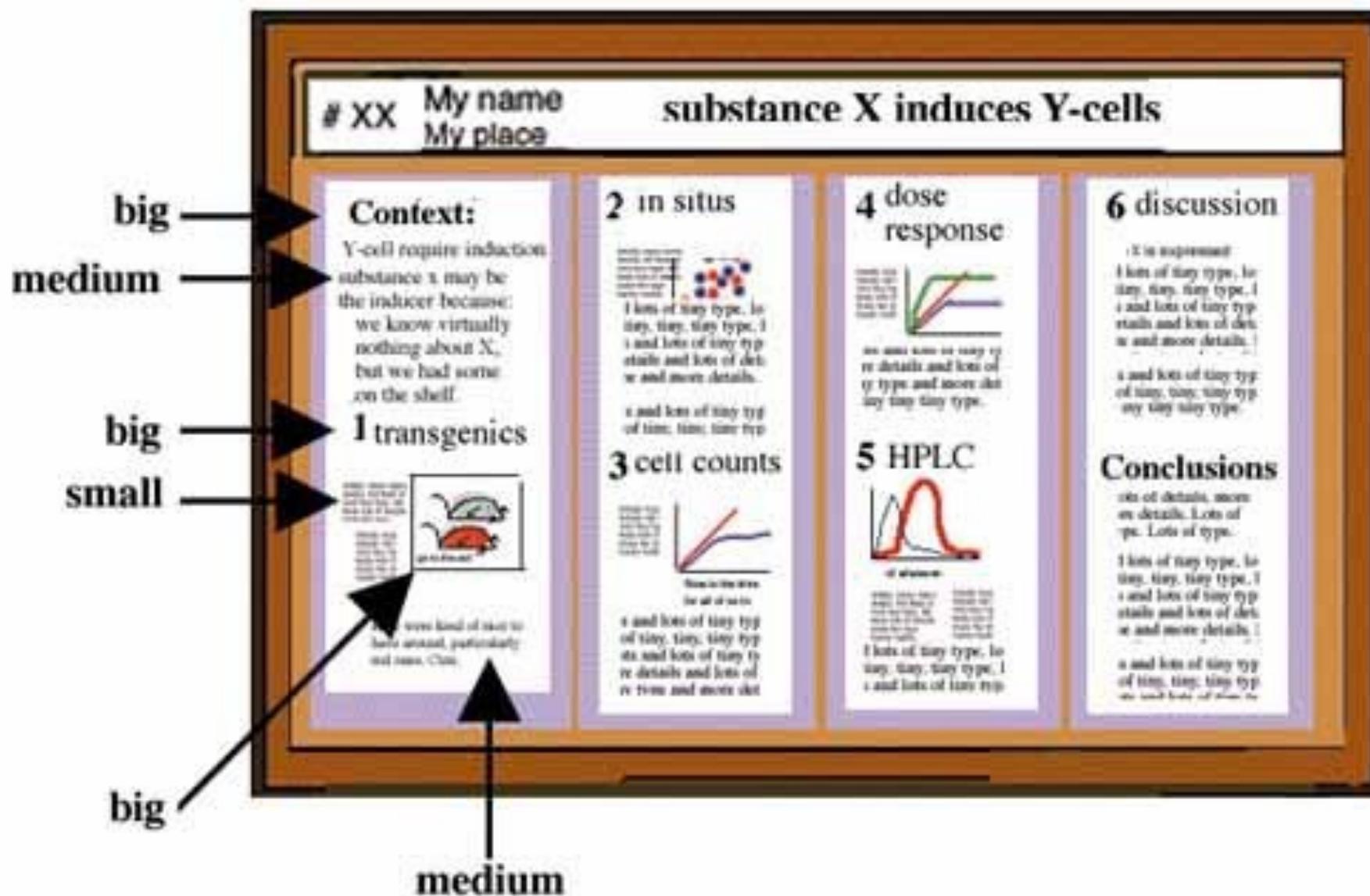


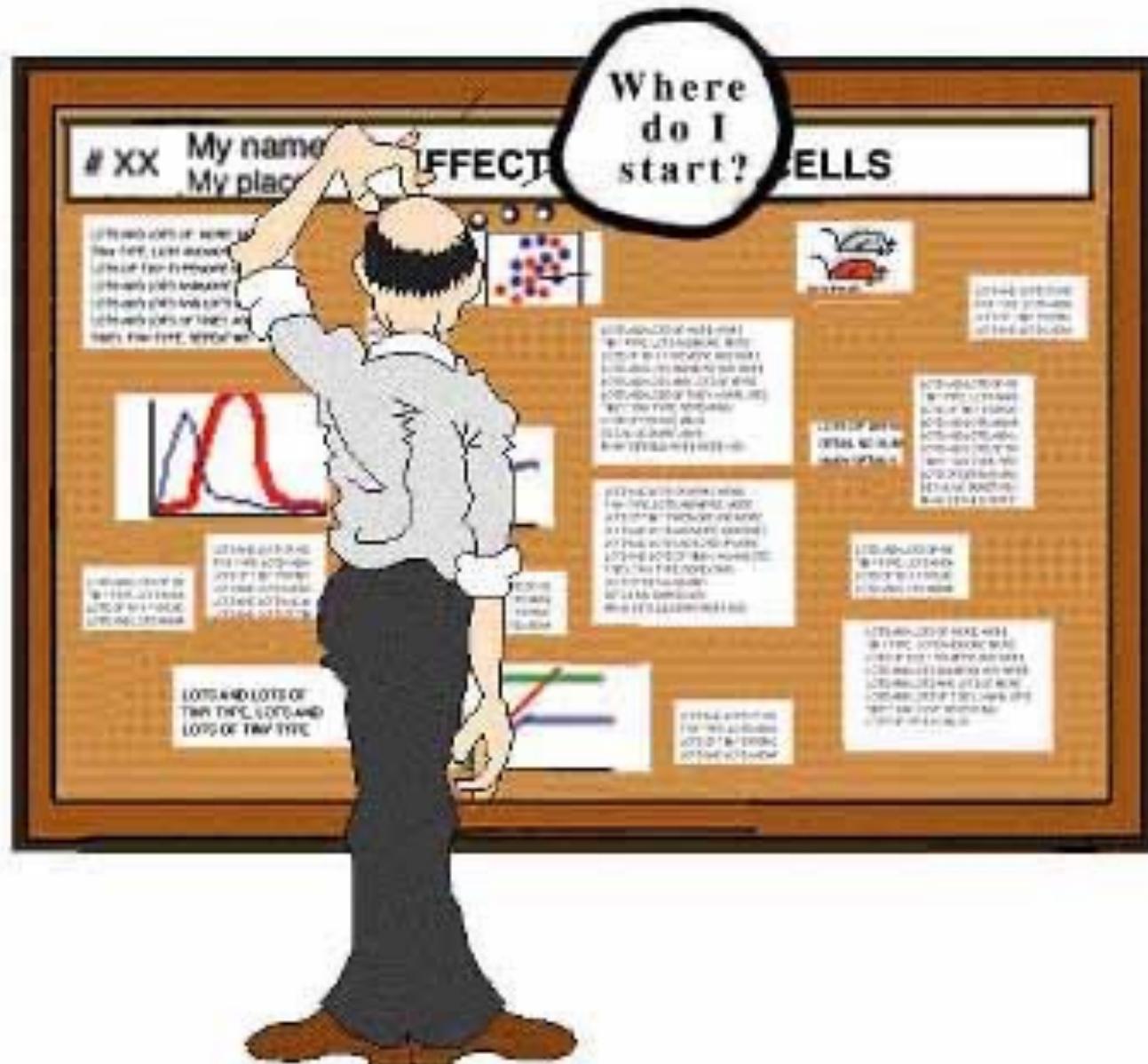


## Your copy should answer...

# 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?	

# I could actually read this







# Pick a software program

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



# PowerPoint



- OK, but the colors will fool you
- Easy to use
- Somewhat Inflexible
- Designed for overhead projection

(be sure to print a color proof to  
see actual colors you have chosen)



# Adobe Illustrator or InDesign



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



Let's design a poster!



## Your poster title:

# Think BIG! Really Big!

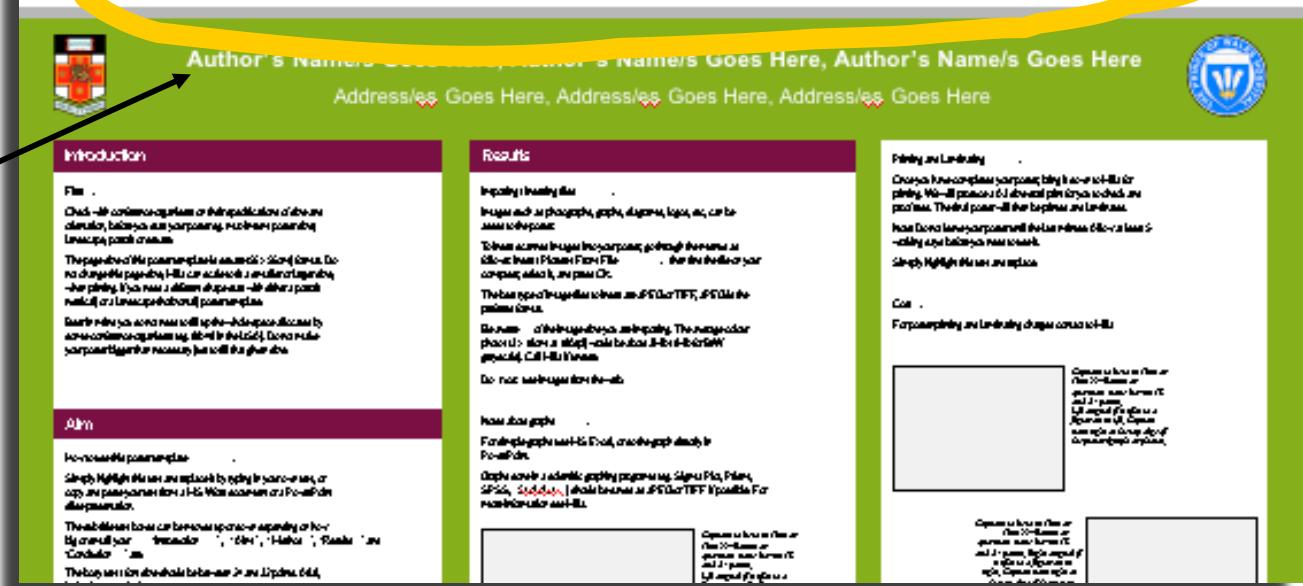
Your biggest impact!

**Boldface** type

Not all caps!

Group authors  
names and  
affiliations

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



The image shows a template for a Cornell Engineering poster. The poster has a green header bar with the Cornell Engineering logo on the right. Below the header, there are three main sections: 'Introduction', 'Results', and 'Conclusions'. Each section contains text and small images. A yellow oval highlights the top section where the poster title would be placed. A red arrow points from the text 'Poster title goes here, containing strictly only the essential number of words...' to this highlighted area. Another red arrow points from the text 'Group authors names and affiliations' to the 'Introduction' section.

**Introduction**

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

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

**Results**

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

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

**Conclusions**

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

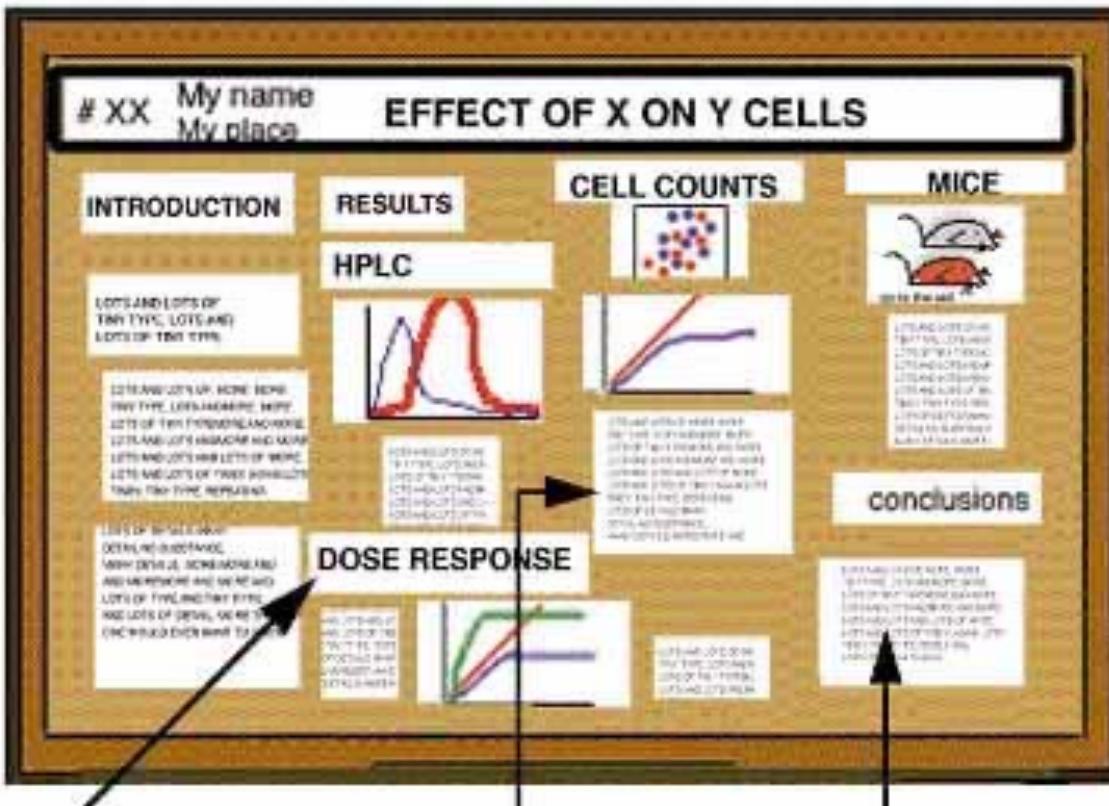
Address/es Goes Here, Address/es Goes Here, Address/es Goes Here

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

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



## The Secrets of Readable Text:



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...

**SYDNEY CHILDREN'S HOSPITAL**

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

**Introduction**

**AIM**

**Results**

**Conclusion**

**Method**

**Acknowledgements**

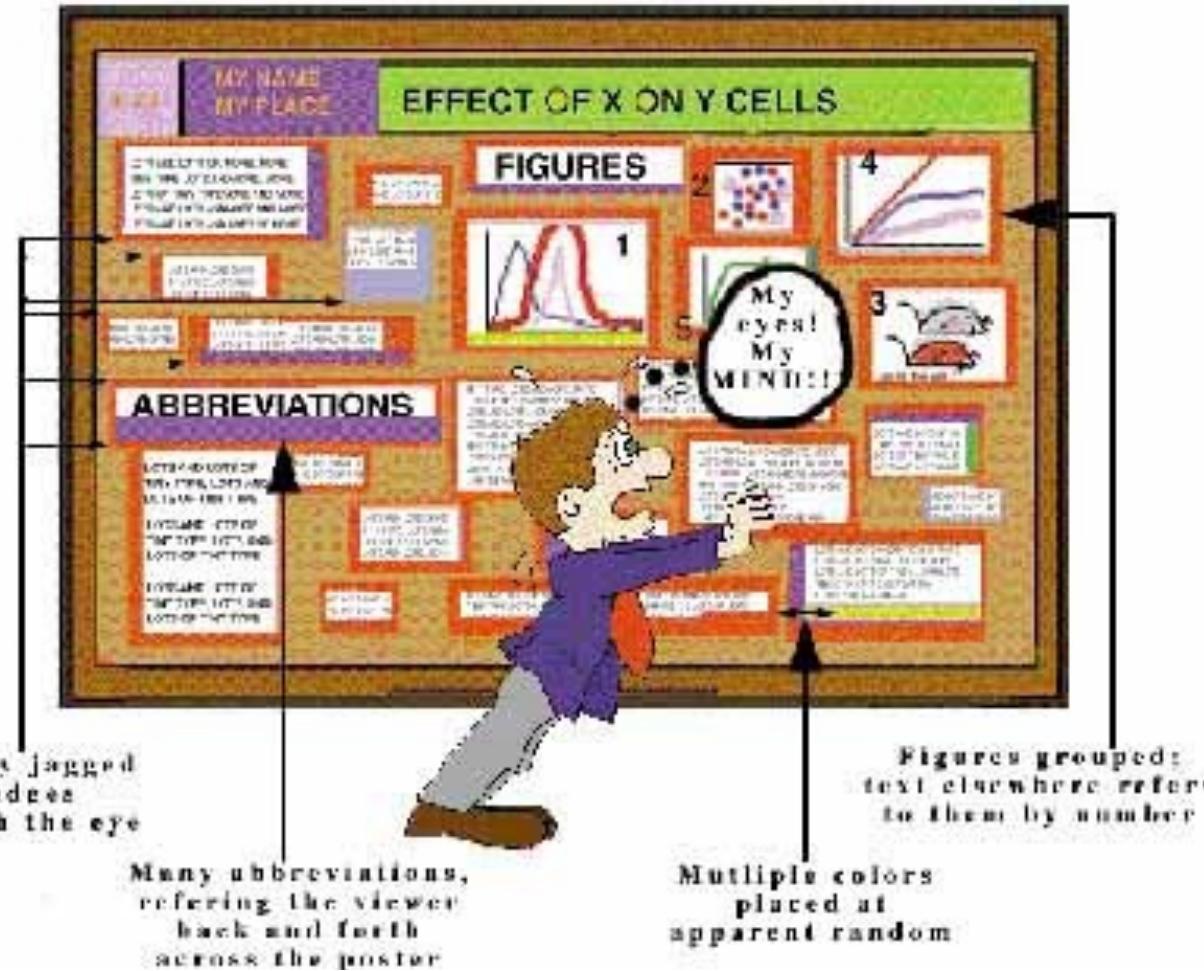
**References**

- Leave breathing space around your text
- Serif font works great here for the small text
- Same size and style in all blocks of copy

# Conclusions first!

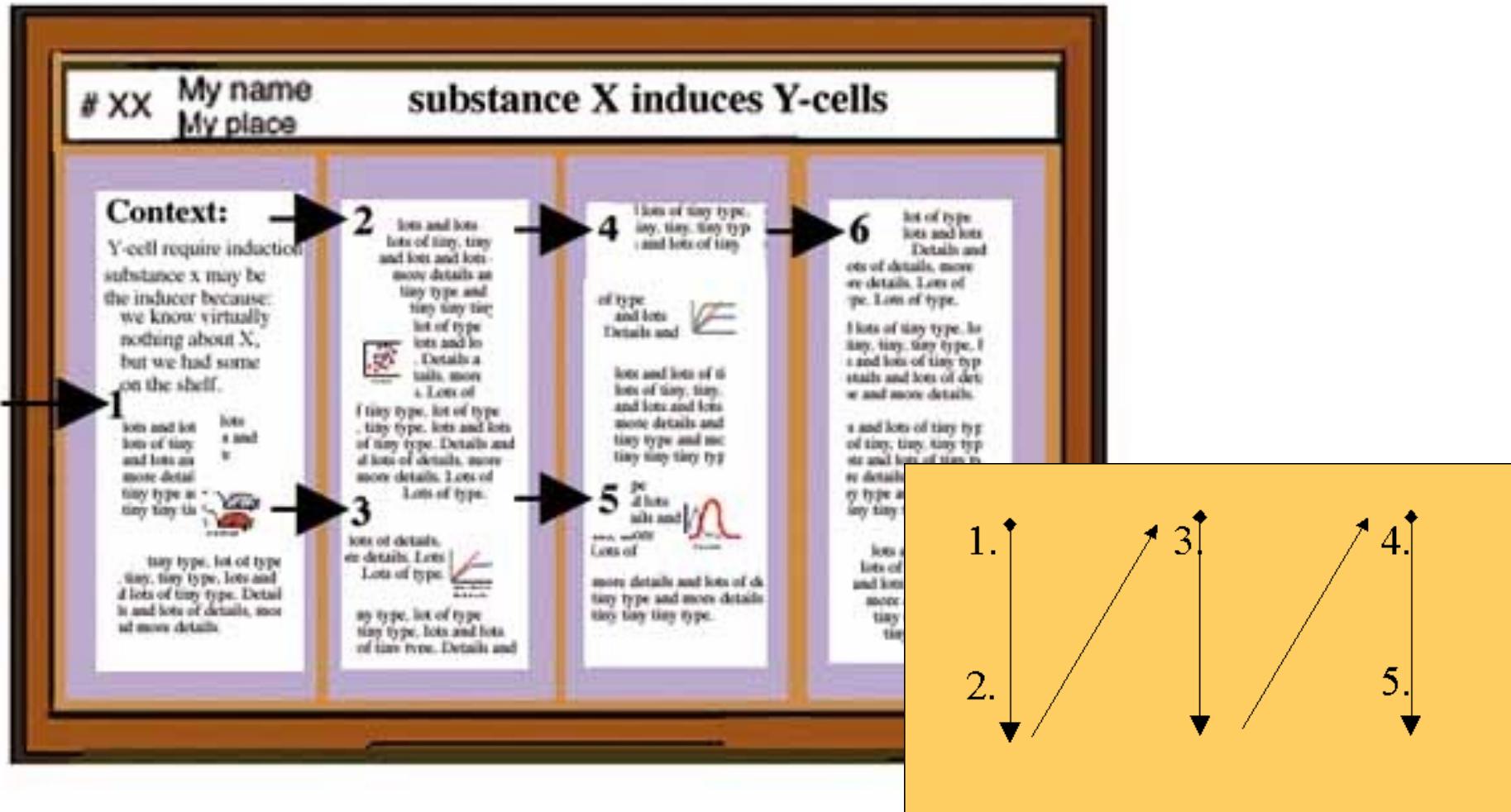
- Put the most important part first!
  - Short and to the point!
  - Upper left hand corner
  - If they like it, they will stick around!

## Design it easy for the eye to follow

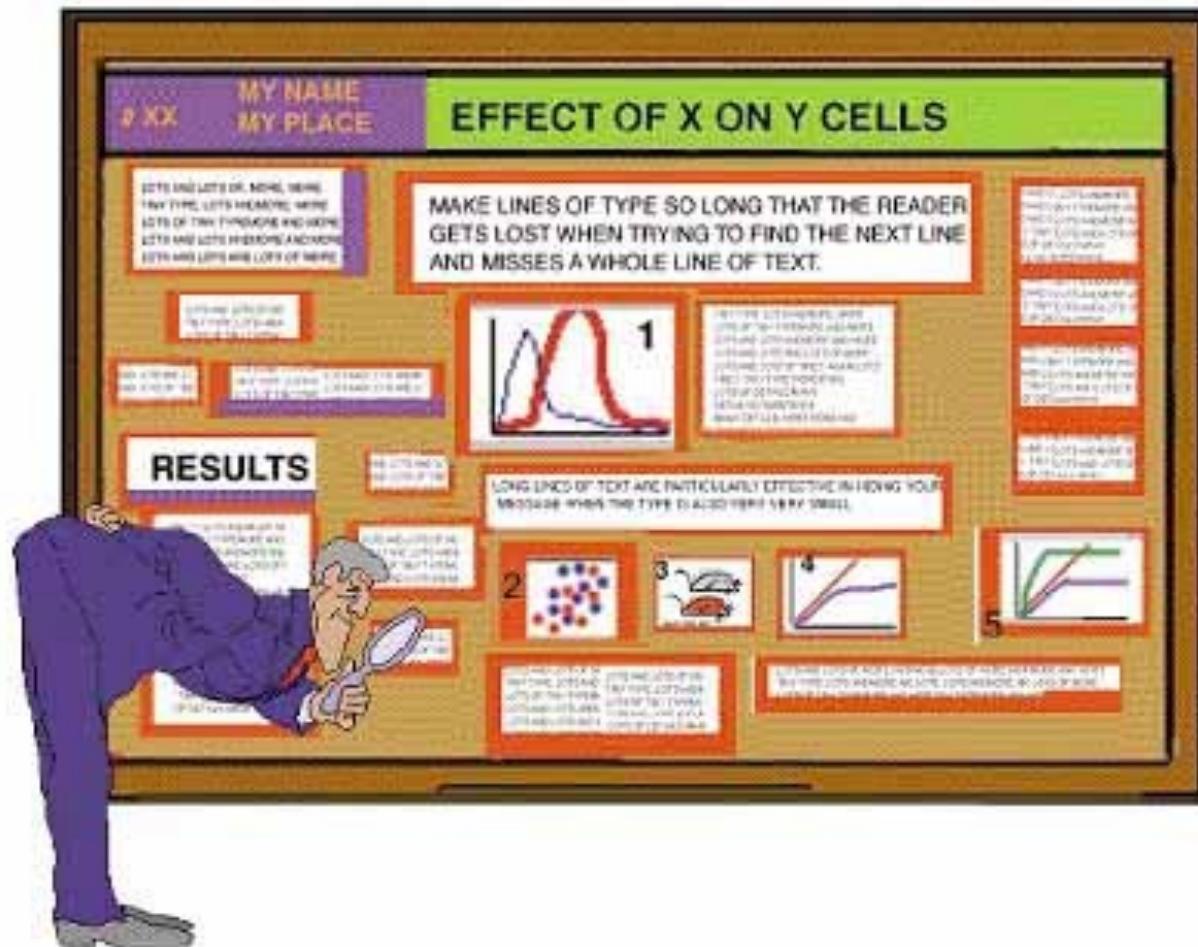


Utter  
chaos will  
make  
folks  
dizzy!

This is the goal for easy reading



## Can anyone read your poster?





## Text sizes:

Title: **85 point**

Authors: **56pt**

Sub-headings: **36pt**

Body text: **24pt**

Captions: **18pt**

The poster features a purple header with white text: "Your Ingenious Teaser Right Here to Woo Them Down to the Body". Below the header is a section titled "Conclusions first: 44 pt bold" with a sub-section "Always put the most important part - your conclusions - first! Place your conclusions in the upper left hand corner of your poster." A green arrow points from the "Title: 85 point" text to this bolded header.

The main content area includes several sections: "Introduction", "Your aim", "Your message", "Layout, photos and print", and "Handouts". Each section contains descriptive text and small images. A green arrow points from the "Authors: 56pt" text to the "Introduction" section.

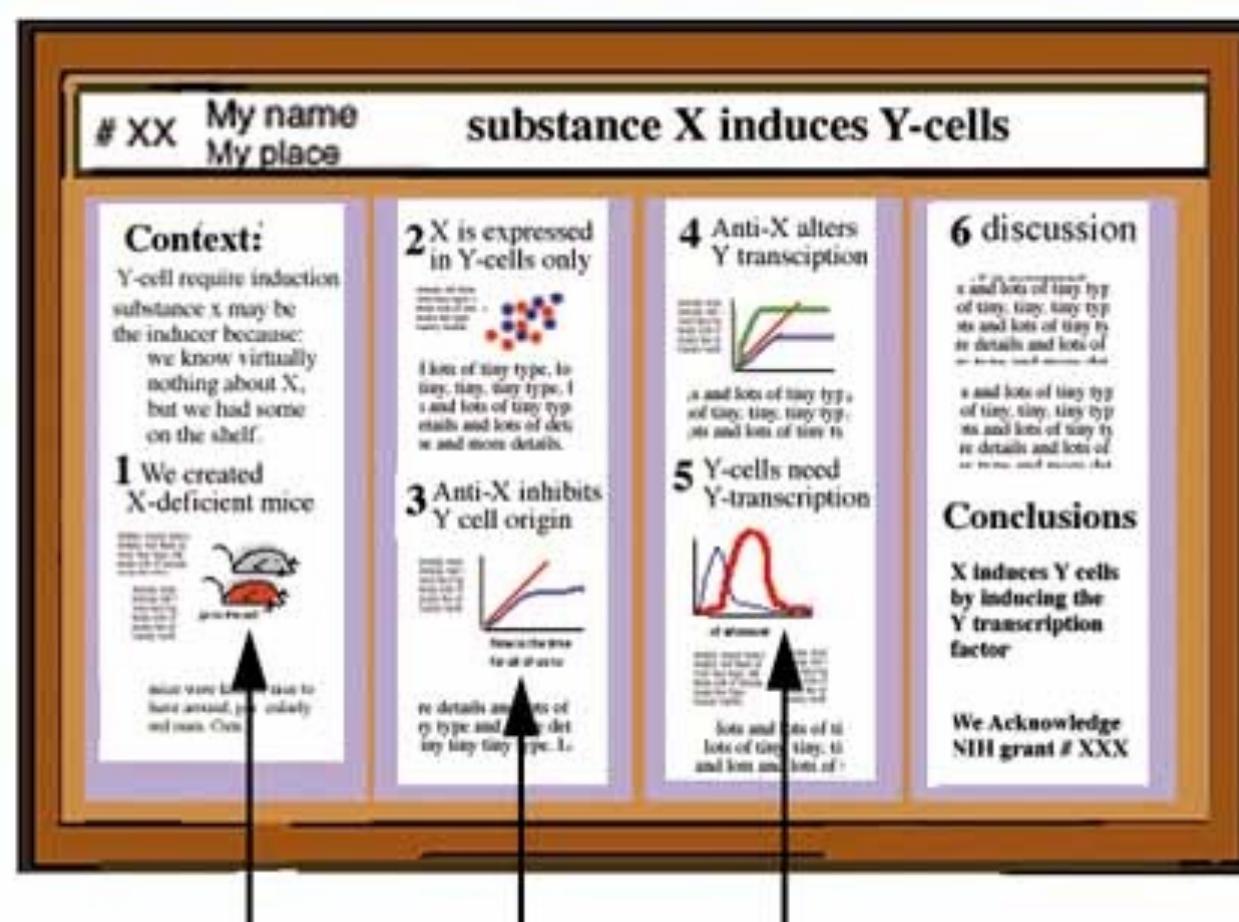
A large central image shows a human head with a brain, with a green arrow pointing from the "Sub-headings: 36pt" text to it.

At the bottom, there are two pie charts and a bar chart, with a green arrow pointing from the "Body text: 24pt" text to the bar chart.

The footer contains contact information: "Karolinska Institutet, Stockholm, Sweden", "Värtavägen 10, 171 65 Stockholm, Sweden", "Telephone 08 511 61 20, Fax 08 511 60 666", and "Email: [kommunikation@ki.se](mailto:kommunikation@ki.se)". A green arrow points from the "Captions: 18pt" text to the footer area.



## Images and graphs say much more than words



## Keep posters visual!



**Southern Flounder Exhibit Temperature-Dependent Sex Determination**

J. Adam Luckenbach\*, John Godwin and Russell Boeski  
*Department of Zoology, Box 7517, 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 broodstock were kept spawned to collect eggs and sperm for in vitro fertilization.
- Hatched larvae were reared from a natural diet of *Artemia* to high protein pelleted food and fed until satiation 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.
- Corals were preserved and later sectioned at 2-6 microns.
- Sex-distinguishing markers were used to distinguish males (spermatogenesis) from females (oogenesis).

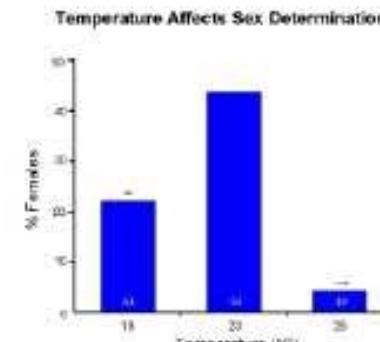
**Histological Analysis**


Male Differentiation

Female Differentiation



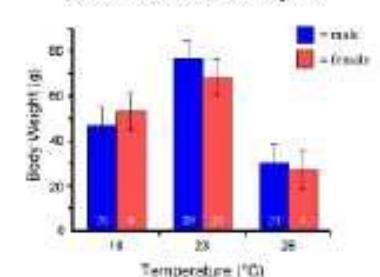
**Temperature Affects Sex Determination**



Temperature (°C)	% Females
18	~18
23	~48
28	~10

\*\*\*P < 0.01 and \*\*\*\*P < 0.001 represent significant deviations from a 1:1 male:female sex ratio.

**Growth Does Not Differ by Sex**



Temperature (°C)	Males (g)	Females (g)
18	~45	~48
23	~75	~78
28	~35	~32

**Results**

- Sex was discernible in most fish greater than 120 mm long.
- High (28°C) temperature produced 4% females.
- Low (18°C) temperature produced 22% females.
- Mid-range (23°C) temperature 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 8-year-old southern flounder.

**Acknowledgements**

The authors acknowledge the Advanced Research Program of the National Marine Fisheries Service and the University of North Carolina Sea Grant College Program for financial assistance. Special thanks to Dr. William D. Ritter III for help with histology.



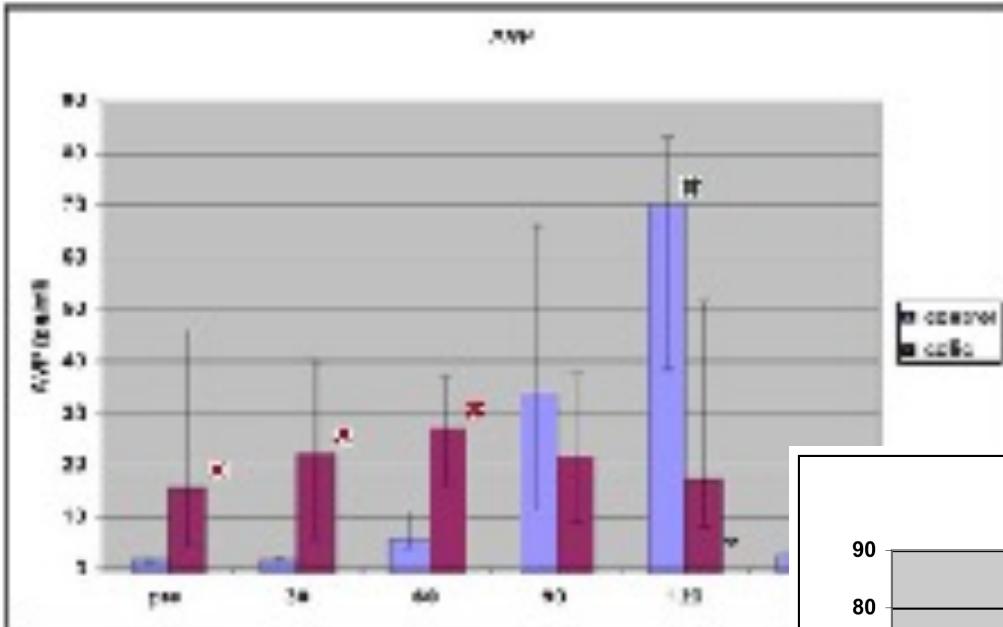
## Picture perfect photos

- Avoid resolution overkill!  
At least 150 dpi, but no more than 300 dpi
- Save photos as jpg or png  
Line art as a png (graphs)
- Web images are usually  
poor resolution 72 dpi

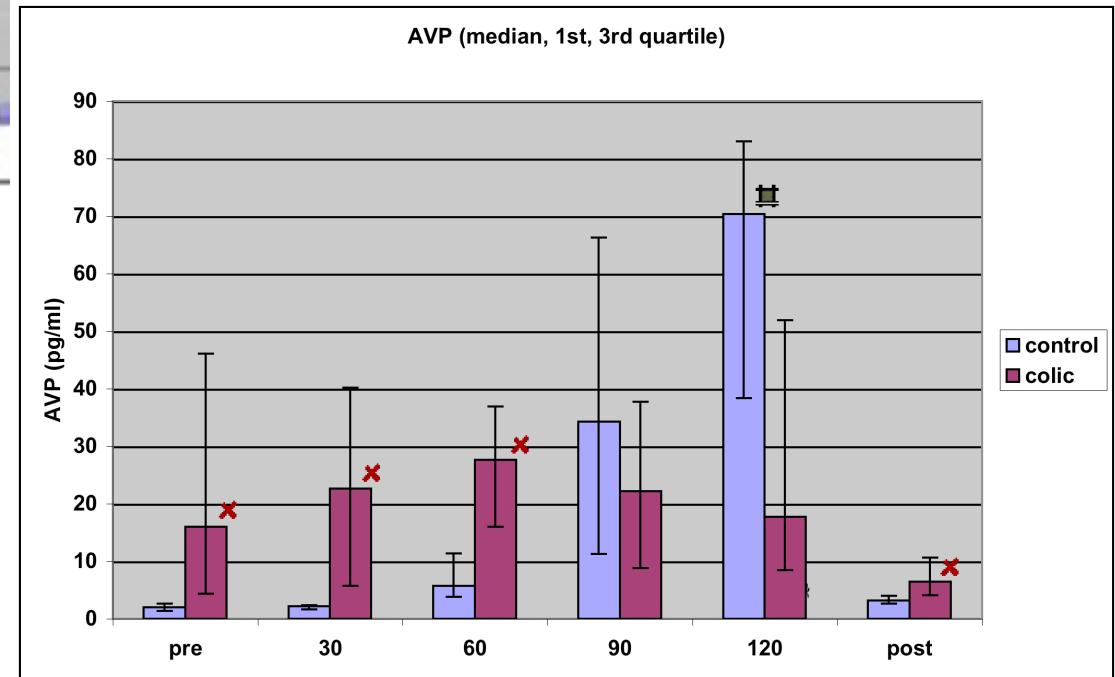


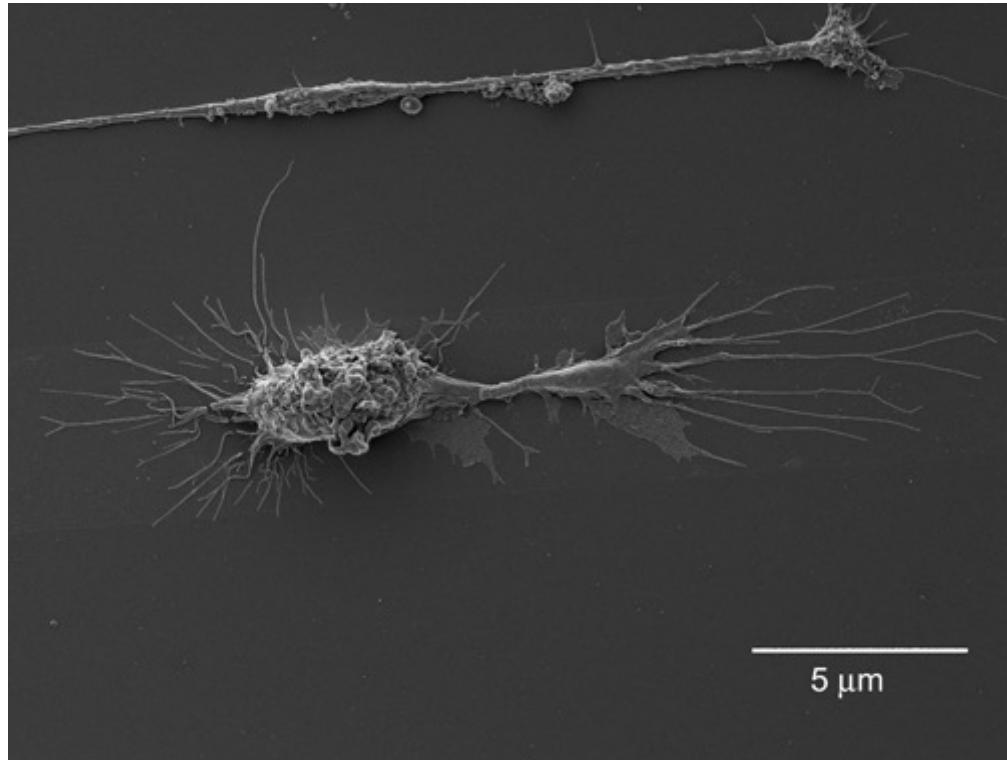
Line art is best displayed as a “png”

jpg (not as crisp)



png





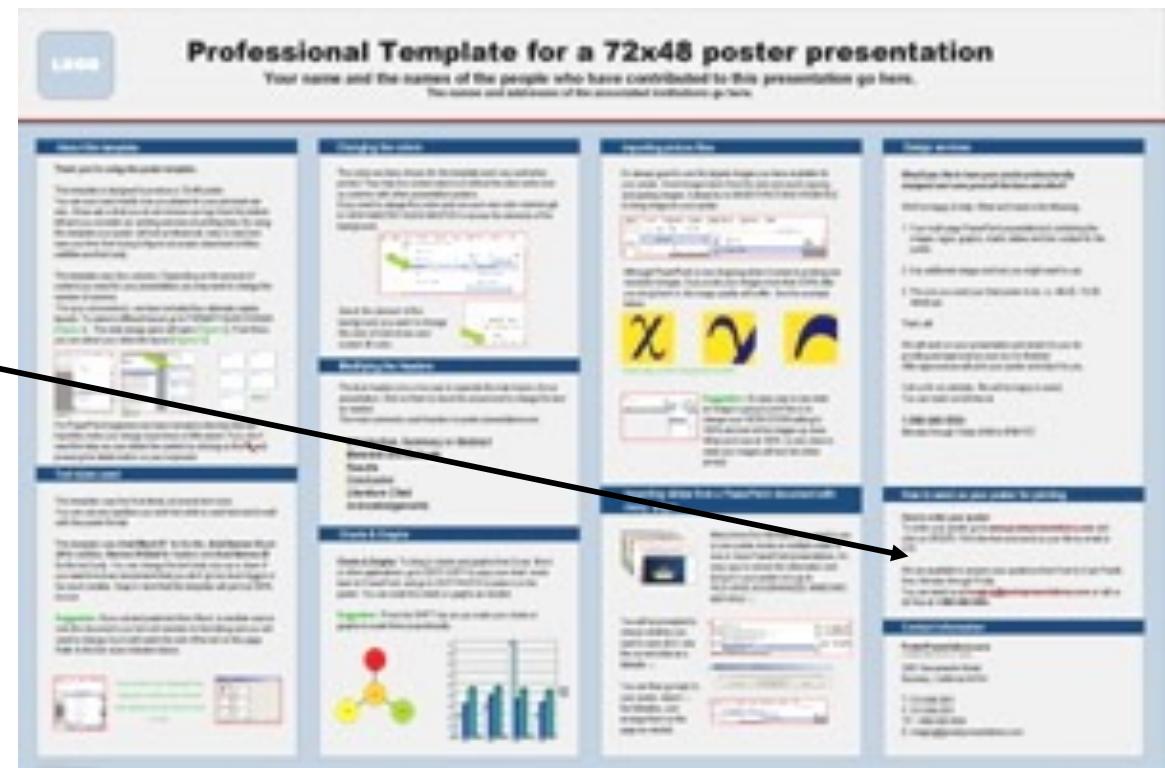
Your cool images  
mean nothing  
without a  
scale bar or  
description

This is a biological something that is...



# Don't forget your funding acknowledgements

Eng, ECE, BME, etc  
Your department can provide you with the required wording



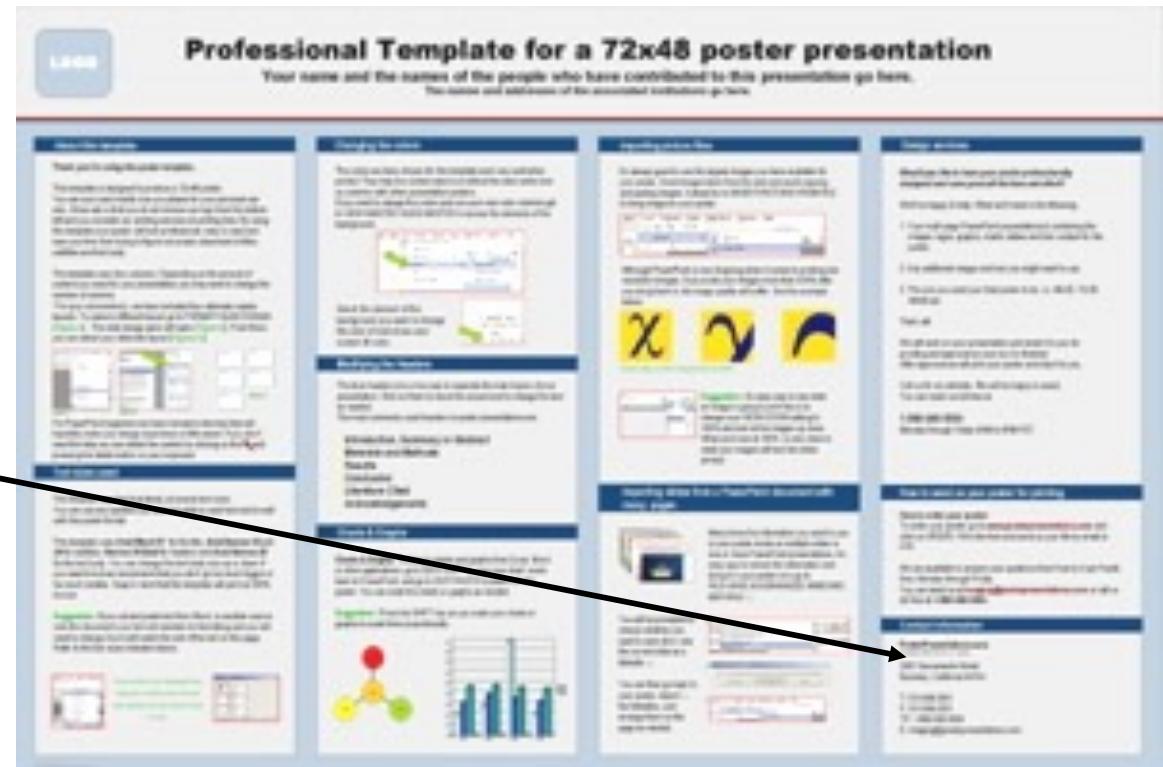


## Your contact info!!!

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**  
Put ...  
Check with conference organizers on their specifications of where to submit before you start your poster.  
maximum poster size: landscape or portrait square.  
The paper size of the poster depends on the size of the presentation hall (e.g. 100x100cm),  
University of Wales College Cardiff, Don't change the paper size. You can scale up or make it larger size when printing. You need a different poster if you have a presentation at a conference or a smaller poster elsewhere.

Remember you are presented with a limited space allocated by some conference organizers (e.g. 100x100cm in the UK). Don't make your poster bigger than necessary (unless you have to).

**Aim**  
How does this poster template ...  
Simply highlight the main message(s) in your own text or copy and paste your text into a MS Word document as a Power Point slide presentation.  
The text font size should be between 24 and 32 points, Arial, Helvetica or equivalent.  
Keep bullet points to a minimum, not justified.  
The colour of the text on the poster background can be changed to the colour of your choice.

**Method**  
That's making a successful poster ...  

- Review your paper in poster form. Simplify everything, make it clear.
- Headings on the poster should be in upper and lower case, not capitals.
- Headlines should be in capitals or underline them to stress your message.
- Bold characters should be used.
- When laying out your poster leave breathing space around your text. Don't overcrowd your poster.
- Try using photographs or colour graphs. Avoiding numerical tables.
- Spelling check and grammar check procedure.

**Results**  
Reporting the results ...  
Images such as photographs, graphs, diagrams, logos, etc. can be added to the poster.  
To print a scan image of your poster go through the menu and choose Print from File ... then follow the instructions on your computer selected and press OK. The best photographic software (JPEG or TIFF, JPEG is the preferred format).  
Be aware of the image size you are printing. The average colour photo (13 x 18cm at 300dpi) would be about 3MB. (More in grayscale). Call the PhotoShop. Do not use images from the web.

**Printing and Lamination**  
...  
Check you've completed your poster (nothing to be left off, nothing to add) and print it on a A3 size printer. You've checked and proofread. The final poster will then be printed and laminated.

**Cost**  
For paper printing and lamination charges contact MU.

**Conclusion**  
For more information:  
Poster Design, Scanning and Digital Photography, and Image Editing.

**Contact**  
Medical Illustration Unit  
Princess Wales Hospital  
Phone: 02922 230  
Email: [MedicalIllustration\\_cwru@cardiff.ac.uk](mailto:MedicalIllustration_cwru@cardiff.ac.uk)  
Webpage: <http://med.cwru.ac.uk>

**Acknowledgements**  
Just highlight the text and replace with your content. Replace this with your text.



# Whoa! Where's my sunglasses?

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

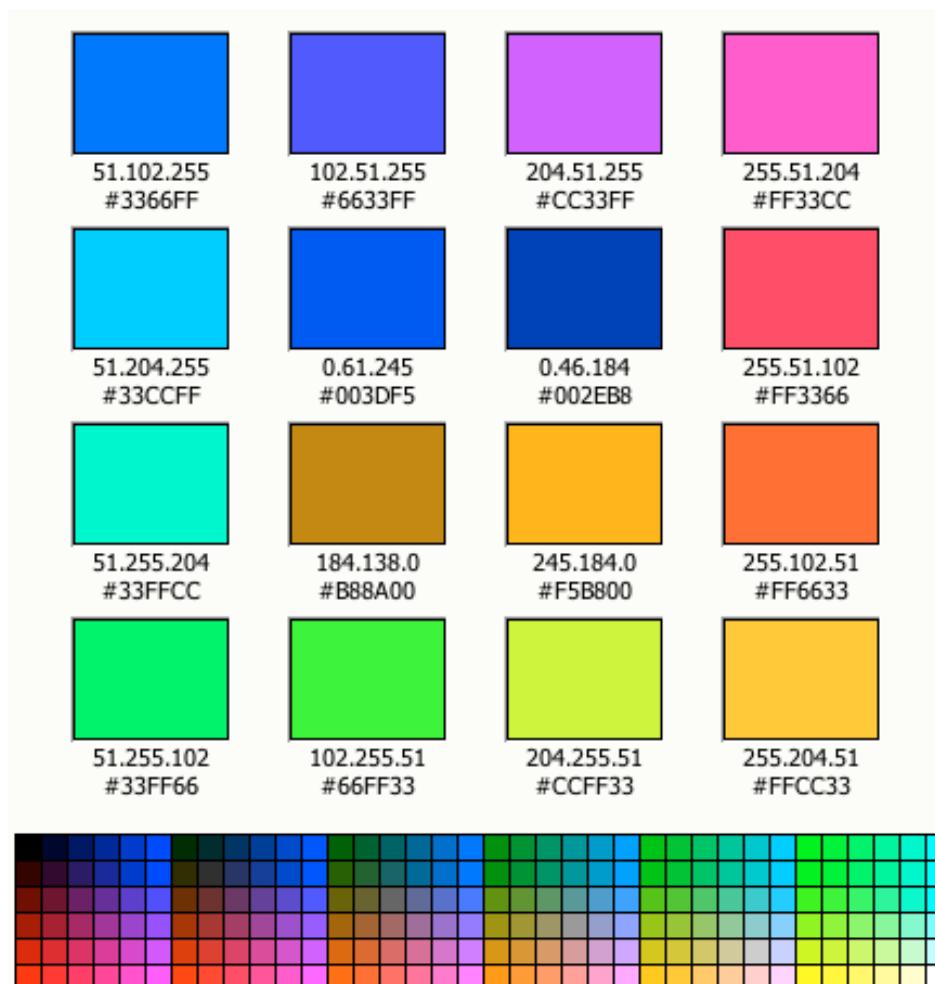
Author's Name/s Goes Here, Author's Name/s Goes Here, Author's Name/s Goes Here  
 Address/es Goes Here, Address/es Goes Here, Address/es Goes Here

Introduction	Method	Results	Printing and Lamination
<p>Plot...          Check with conference organizers on their specifications about size and font before you submit your poster by medium poster size (landscape, portrait square).          The page size of this poster template is A0 (36x48cm) landscape (horizontal) format. Do not change this page size. You can scale up or down if larger or smaller when printing. You must not alter margins, and make a portrait (vertical) or a square poster template.</p> <p>Bar in mind you do not need to fill up the whole space allotted by some conference organizers (e.g. SAE in the USA). Don't make your poster bigger than necessary just to fit it in.</p> <p>Check with conference organizers on their specifications about size and font before you submit your poster by medium poster size (landscape, portrait square).          The page size of this poster template is A0.</p> <p><b>Aims</b></p> <p>Now parametrize your poster to ...          Simply highlight text and replace by yours in your own text copy and paste your text onto a MS Word document a Power Point like presentation.</p> <p>The sub-sections can be easily up-dated especially in how big or small your 'Introduction', 'Aim', 'Method', 'Results' and 'Conclusion' are.</p> <p>The body text font should be between 14 and 18pt Arial, Helvetica or similar.</p> <p>Keep copy text to a maximum of 10 lines.</p> <p>The color of other text like background can be changed to blue.</p>	<p><b>Tips to making a successful poster</b></p> <ul style="list-style-type: none"> <li>Remember your paper has a formal layout. Simply anything which does not fit.</li> <li>Headings, chapter titles etc should be in upper and lower case, not capitals.</li> <li>Never use double underscores in capitals or underline stress your purpose. Use bold characters instead.</li> <li>When laying out your poster leave breathing space around your text. Don't overcrowd your poster.</li> <li>Try using photographs or colour graphs / avoiding numerical tables.</li> <li>Spelling check and grammar check using Microsoft Word.</li> </ul> <p><b>Experiments</b>          Experiments are in the Research section. There are experiments in the Introduction, Methods and Results. Each experiment is a separate box. It contains a figure or graph. Experiments are on the top edge of the page. Experiments are in the bottom edge of the page.</p> <p><b>Graphs</b>          Graphs are in the Research section. There are graphs in the Introduction, Methods and Results. Each graph is a separate box. It contains a figure or graph. Graphs are on the top edge of the page. Graphs are in the bottom edge of the page.</p>	<p><b>Printing</b>          Printing (laminating) ...          Once you have completed your poster bring it over to Mu for printing. Mu will provide a 4-colour printer. You need to pay a fee. The final poster will then be printed and laminated.</p> <p><b>Posters</b>          Posters are in the Research section. There are posters in the Introduction, Methods and Results. Each poster is a separate box. It contains a figure or graph. Posters are on the top edge of the page. Posters are in the bottom edge of the page.</p>	<p><b>Printing and Lamination</b> ...          Once you have completed your poster bring it over to Mu for printing. Mu will provide a 4-colour printer. You need to pay a fee. The final poster will then be printed and laminated.</p> <p><b>Posters</b>          Posters are in the Research section. There are posters in the Introduction, Methods and Results. Each poster is a separate box. It contains a figure or graph. Posters are on the top edge of the page. Posters are in the bottom edge of the page.</p> <p><b>Cost</b> ...          For poster printing and laminating charges contact Mu.</p>
<p><b>Conclusion</b></p> <p>For more information          Poster Design, Scanning and Digital Photography, and Image Editing.</p> <p><b>Contact</b></p> <p>Medical Illustration MuH          Peter Macleod Hospital          Ph: 0332-2200          Email: <a href="mailto:mu@med.monash.edu.au">mu@med.monash.edu.au</a>          Website: <a href="http://mu.med.monash.edu.au">http://mu.med.monash.edu.au</a></p>	<p><b>Acknowledgements</b></p> <p>Just highlight text and replace with your own text.          Replace it with your text.</p>		

This attracts attention but tires out the eye



## Be carefull with the primary colors





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.

# 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](mailto:anread@unity.ncsu.edu)



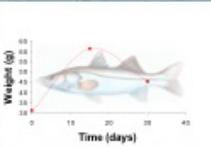
**PROPOSED OBJECTIVE**

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

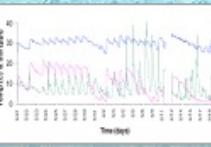
**RESULTS**

**North Creek Lower (High Variability)**



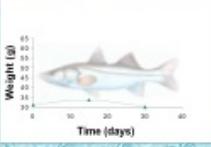
**Negative Growth:**  
 Dissolved Oxygen (mg/L)  
 0-22  
 Salinity (ppt)  
 2-21  
 Temp (°C)  
 25-34

**North Creek Middle (Medium Variability)**

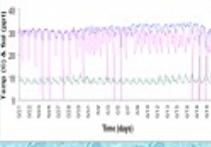


**Positive Growth:**  
 Dissolved Oxygen (mg/L)  
 0-8  
 Salinity (ppt)  
 16-28  
 Temp (°C)  
 30-38

**North Creek Upper (Low Variability)**

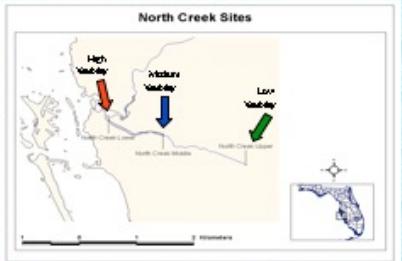


**Slow Growth:**  
 Dissolved Oxygen (mg/L)  
 0-4  
 Salinity (ppt)  
 16-30  
 Temp (°C)  
 26-33



DO (mg/L)    Sal (ppt)    Temp (°C)

**STUDY SITES**



**METHODS**



1. Juvenile snook are raised to 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



This is an award winning poster, too the point, simple images, easy to read in a couple minutes.

**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 broodstock were kept spawned to collect eggs and sperm for in vitro fertilization.
- Fertilized larvae were reared from a natural diet (infusoria) to high protein pelleted feed and fed until initiation at least twice daily.
- Upon reaching a mean total length of 40 mm, the parent flounder were stocked at equal densities into one of three temperatures (18, 23, or 28°C) for 245 days.
- Genets were preserved and later sectioned at 2-6 microns.
- Sex-distinguishing markers were used to distinguish males (spermatogenesis) from females (yolk sacs).

**Histological Analysis**

**Temperature Affects Sex Determination**

% Females

Temperature (°C)	% Females
18	~22
23	~44
28	~5

\*<sup>\*\*</sup>P < 0.01 and \*\*\*P < 0.001 represent significant deviations from a 1:1 male:female sex ratio.

**Rearing Temperature Affects Growth**

Body Weight (g)

Temperature (°C)	Body Weight (g)
18	~35
23	~55
28	~25

**Growth Does Not Differ by Sex**

Body Weight (g)

Temperature (°C)	Male (Blue)	Female (Red)
18	~45	~48
23	~75	~70
28	~30	~28

**Results**

- Sex was discernible in most fish greater than 120 mm long.
- High (28°C) temperature produced 5% females.
- Low (18°C) temperature produced 22% females.
- Mid-range (23°C) temperature 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-maturing 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 8 year southern flounder.

**Acknowledgements**

The authors acknowledge the Advanced Graduate Program of the National Marine Fisheries Service at the University of North Carolina, the Great Lakes Protection Fund, and the National Sea Grant Program for funding assistance. Special thanks to Dr. William D. McMillan for help with graphics.



## A little background color added

**NC STATE UNIVERSITY**

### Southern Flounder Exhibit Temperature-Dependent Sex Determination

J. Adam Luckenbach\*, John Godwin and Russell Borski  
*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 broodstock were strip spawned to collect eggs and sperm for *in vitro* fertilization.
- Hatched larvae were weaned from a natural diet (rotifer) to high protein pelleted feed and fed until satiation 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.
- Gonads were preserved and later sectioned at 2-6 microns.
- Sex-distinguishing markers were used to distinguish males (spermatogenesis) from females (oogenesis).

**Histological Analysis**

Male Testes section  
Female Ovaries section

**Temperature Affects Sex Determination**

Temperature (°C)	% Females
18	~22
23	~44
28	~5

(\*\*P < 0.01 and \*\*\*P < 0.001 represent significant deviations from 1:1 male:female sex ratio)

**Growth Does Not Differ by Sex**

Temperature (°C)	Males (g)	Females (g)
18	~45	~55
23	~75	~70
28	~30	~25

**Results**

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

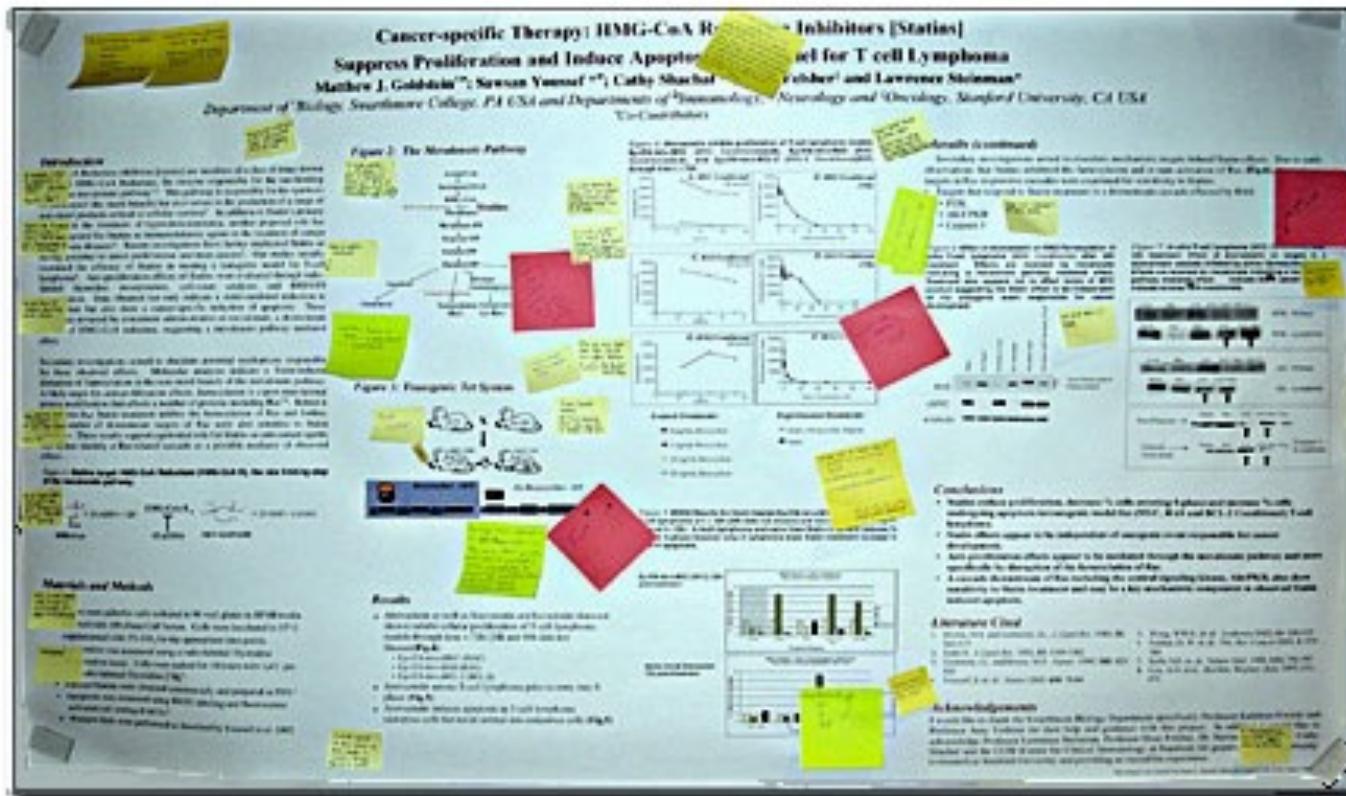
**Conclusions**

- 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 (< 1 year) southern flounder.

**Acknowledgements**

The authors acknowledge the National Oceanic and Atmospheric Administration, National Marine Fisheries Service and the University of North Carolina Sea Grant College Program for funding research specifically to Lee Wiers and Bob Borski for helping with work.

# Edit, Edit, Edit and Evaluate!





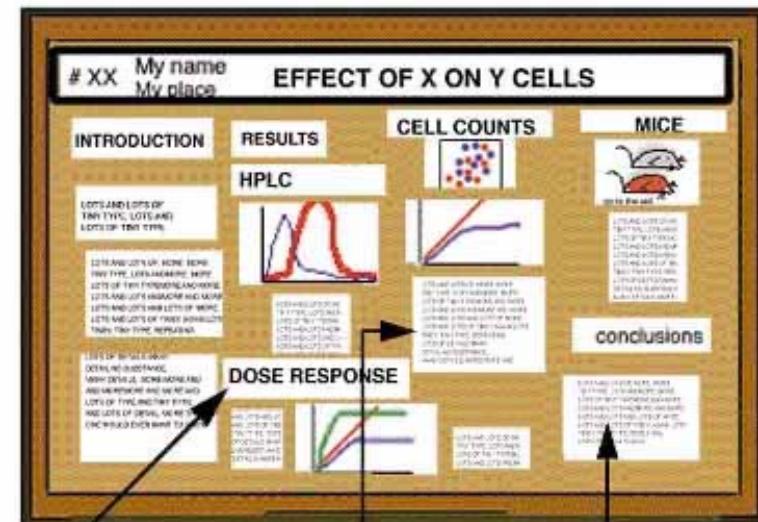
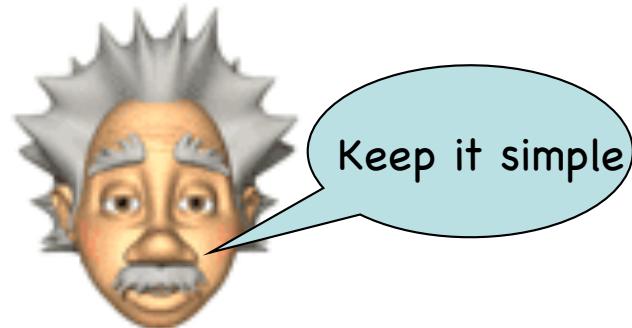
## Print out a letter size draft

Can you read the type?

Are these the colors you really want?

Does it look too busy?

Do my main points pop?



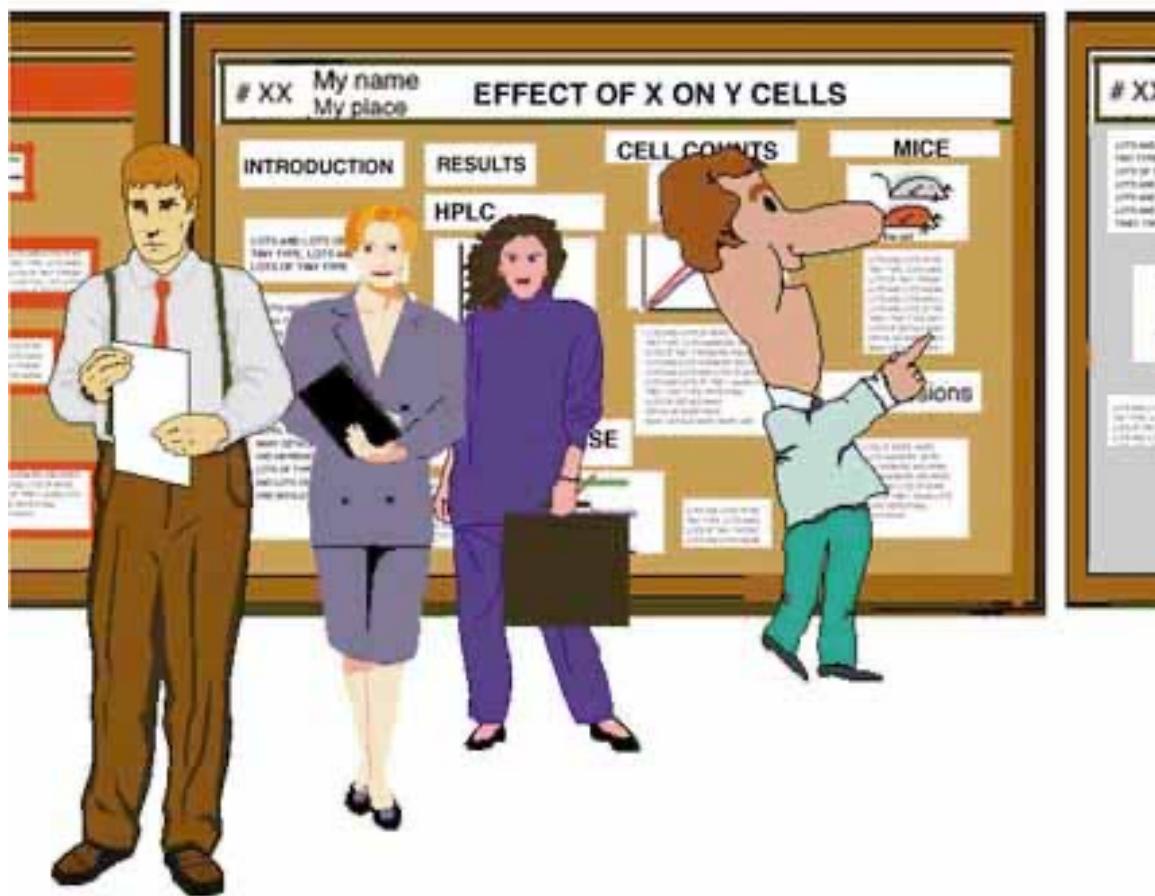
Large type  
states methods,  
not results

Results  
artfully buried in a  
methods description

Carefully  
omits  
interpretations

# You're not done yet...

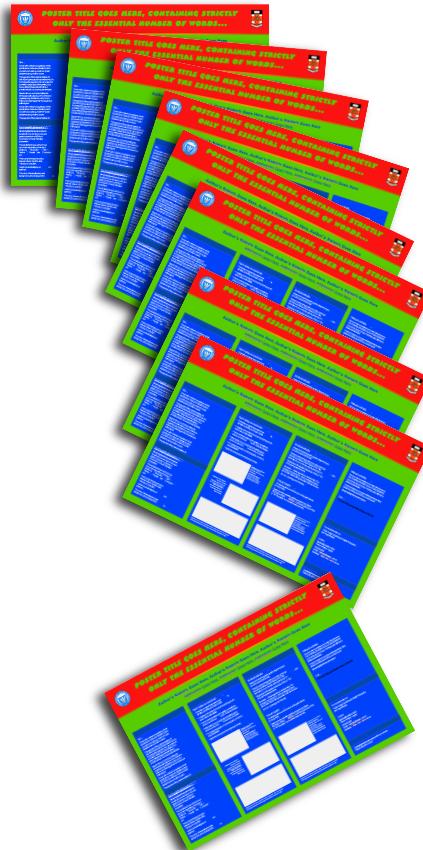
Prepare a 3-5 minute verbal explanation



Is he ever  
going to  
SHUT UP???



## Prepare mini size poster handouts



- Provides a written record for interested folks
- Makes you look “smart”
- 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 Hess<sup>1</sup>, John Poulsen<sup>2</sup>, Raymond O'Connor<sup>2</sup>, Jeff Bay<sup>3</sup>

### 1. Windbreaks as Habitat

Agricultural land — fields, pastures, and orchards — are managed to produce food and fiber for people. In the U.S. Great Plains, an agricultural landscape dominated by large fields is often used to protect fields, crops, livestock, and homes from the prevailing winds. Windbreaks provide some of the same windbreak habitat for birds and other species that the large open fields do not. While 70% of the land area of the western U.S. is under cultivation, much of the other wooded cover occurs along riparian corridors.

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

- ★ Early windbreaks were sampled using two-stage sampling with a frame stratified by intensity of cultivation.
- ★ Most sample windbreaks fall in or near native cropland.
- ★ Habitat characteristics of each windbreak were measured in 1994.
- ★ Thirty-six farmers allowed windbreaks to return in 1994.

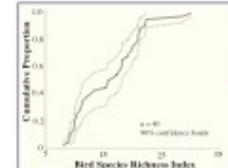
### 2. Regional Evaluation of Windbreaks

The Environmental Monitoring and Assessment Project's Agricultural Land Growth — charged with assessing the ecological condition of U.S. agricultural lands — undertook a pilot study to evaluate the value of windbreaks on a regional basis. We decided to use a bird species richness index to estimate the habitat value of individual windbreaks.

We selected a random sample of 100 windbreaks in Nebraska, based on a screening question on a USDA National Agricultural Statistics Service agricultural survey. In May 1994, field crews measured attributes of 40 windbreaks from most of the farms visited in previous years. We used these data to estimate the value of windbreaks as breeding bird habitat in Nebraska.

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

- ★ Using expansion factors associated with each sample, we estimated the habitat value of windbreaks for the region graphically.
- ★ We estimated that half of Nebraska's windbreaks support more than 10 breeding bird species graphically.
- ★ We also estimated that between 15% and 25% of all windbreaks in Nebraska (1.5 hectare plots) do not deserve, suggesting that few Nebraska windbreaks provide habitat for forest interior or area sensitive birds.

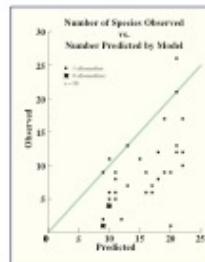


### 4. Validating BSRI Model

In 1994, a team of five ornithologists revisited 10 of the 40 windbreaks (15 farmers refused further visits) between late May and early July.

Each windbreak was visited four times. Data were collected between one-half hour before and four hours after sunrise. All observed birds were identified to species and recorded using spot mapping techniques. Total bird abundance was the sum of the counts recorded and was plotted on a final pass through the windbreak for each visit.

Because no windbreaks were missed, we assumed all species were detected.



### 5. Results of Validation

The model overestimated the number of bird species in the Nebraska windbreaks graphically. However, the relative qualitative ranking of windbreaks generally remained. A total of 31 species were observed.

No strong, significant relationship was found between distance of observed from predicted number of species and any windbreak metrics or its geographic location of individual windbreaks.

Forest interior, savannas, and forest edge species occurred in the larger, more complex windbreaks.

Open land prairie species occurred in the smaller, denser, 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.

D) **Geographic differences in species richness.** The model was developed in Kansas, which has 3-20 more species of bird than 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), 65 ha containing the sample windbreak. Cover categories were tree, woodland, open grass, herbaceous, human (non-agricultural), and water. Forests and cattle grazing were also recorded (present/absent).

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.

3) **The deviation between observed and predicted number of species was not significantly related to any of the landscape metrics.** This suggests that while a region's number of species using a windbreak depends primarily on windbreak attributes.

3) **The presence of species unique to windbreaks (e.g., forest interior, prairie) may be explained by windbreak size and complexity.** The model may be more useful for predicting the presence or absence of species, rather 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 kind 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.

<sup>1</sup> North Carolina State University, Forestry Department, Raleigh, NC  
<sup>2</sup> University of Maine, Department of Wildlife Ecology, Orono, ME  
<sup>3</sup> North Carolina State University, Statistics Department, Raleigh, NC



A bit text heavy  
but not too bad.



**Determining the Wear Resistance of Occlusal Splints in a Prospective Clinical Study**

P. Ottl, P. Schmelz, A. Piwowarczyk, H.-Ch. Lauer  
 Dept. of Prosthodontics, School of Dentistry (Director: Prof. Dr. H.-Ch. Lauer), ZZMK (Carolinum), J. W. Goethe University, Frankfurt, Germany

**Objective**

- To determine quantitatively the wear resistance of a newly developed light-curing splint resin over a period in situ of six months.

**Materials and Methods**

**Patients**  
 n = 20 consecutive patients  
 (mean age: 34.7 years; 12 F, 8 M)

**Inclusion criteria**

- Natural dentition/fixed denture
- Complete dentition to at least the 1st molar and
- for the **stabilization splint sample**:

  - Inadequate occlusal support
  - Increased occlusal loss of dental hard tissue

- for the **distraction splint sample**:

  - TMJ pain and
  - Complete anterior dislocation of the disk without reduction with terminal reduction
  - TMJ osteoarthritis

**Fig. 1:** Stabilization splint in situ

**Resin splint material (Fig. 1)**

- Light-curing (400–500 nm) resin made of high-molecular dimethacrylates with organic and inorganic fillers
- Does not contain methyl methacrylate

**Study design**

- Duration: 6 months
- Types of splints (n = 10 each): stabilization splints, distraction splints
- Splint wear mode: 24 hours
- Examinations: before insertion (BI), at 4 weeks (4W), at 3 months (3M), at 6 months (6M)
- Occlusal adjustments were restricted to the time before 4W.

**Fig. 2:** Occlusal vertical gain/loss (mm) of the teeth in situ over a period in situ of six months (n = 10 stabilization splints)

Time	13	23	26	31	32	33	34	35	36	37
BI	-0.04	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06
Posterior teeth	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06

**Fig. 3:** Test setup

**Measuring technology (Fig. 2)**

- Vibration-isolated table framework
- 3 translation stages (for directions x, y, and z) (DC-Motor) (PI, Waldbronn)
- DV 4 stereomicroscope (Zeiss, Oberkochen)
- WA 20 inductive displacement transducer/Spider® digital 8-channel measurement unit/Camus 32 software V2.1 (HBM, Darmstadt)
- Local coordinate storage for occlusal contacts during baseline measurements
- Ten measurements each in regions 13, 23, 16, 26 (BI, 4W, 3M, 6M)
- Splint repositioned on remount cast

**Fig. 4:** Occlusal vertical gain/loss (mm) of the teeth in situ over a period in situ of six months (n = 10 distraction splints)

Time	13	23	26	31	32	33	34	35	36	37
BI	-0.04	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06
Posterior teeth	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06	-0.06

**Fig. 5a and b:** Sagittal occlusal section of the condyle/teeth joint after 6 months of wear. a) No splint, b) with distraction splint inserted (Fig. 3) following 4 months of wearing

**Conclusions**

- The present study clinically confirms the good wear resistance results of the new resin splint material obtained in a previous *in-vitro* study [OTTL et al., *Dtsch Zahnärztl Z* 52, 342 (1997)].
- Good wear resistance is of great importance for maintaining the therapeutic mandibular position during the treatment period (Figs. 5a and b).

**Results**

- The medians of the occlusal vertical gains/losses (wear, resin torsion, water sorption, etc.) are shown in Fig. 3 (stabilization splints) and Fig. 4 (distraction splints).



Nice poster



**A Framework for Assessing the Condition of Agricultural Lands**

George Hess<sup>1</sup>, Anne Hellkamp<sup>2</sup>, Mike Maunder<sup>3</sup>, Steve Peck<sup>3</sup>, Lee Campbell<sup>3</sup>, Betty McQuaid<sup>4</sup>, Steve Shafer<sup>3,5</sup>

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.

**Sustainability**

**Sustainable agriculture** has been discussed, defined, and debated in countless papers. Definitions tend to be broad and ambiguous, ecological, economic, social, and even policy dimensions. Although these dimensions are interrelated, each may be examined 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 valued biotic and abiotic resources are conserved and protected. *Agricultural land in good condition is productive and does not compromise valued resources. Sustainability is the ability to maintain good condition over time.*

**Productivity**

**Land Stewardship**

**Indicators were selected to reflect crop productivity and land stewardship.**

**Potential Indicators for Annually Harvested Herbaceous Cropland**

As a working point, we chose to measure our efforts on developing indicators for **annually harvested herbaceous cropland – field planted and crops are harvested every year** whether the plants are annual or perennial. Common examples are corn, wheat, soybeans, alfalfa hay, and hayseeds.

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 Natural Resources Conservation Service's Natural Resource Inventory data.

**Field Index** soils as if crop yields for sowing expectation based on soil, climate, weather, and management.

**Crop-Risk Index** the risk of future pest and disease outbreaks.

**Field Community Index** reflects the diversity of insects in an agroecosystem and may serve as an early predictor of changing environmental conditions.

**Soil Community Index** may reflect the ability of soil organisms to cycle nutrients.

**Plant Productivity** output of the crop system.

**Farmer Inputs** application of ecological knowledge to reduce pesticide use.

**Atmosphere** a crop system that uses energy to produce and apply excess N can become a pollutant.

**Water & Nutrient cycling** application of biodegradable particles to beneficially treat runoff to water quality.

**Soil Health** physical, chemical, and biological ability of soil to provide the air, water, and nutrient plants need to grow.

**Agroforestry Index** buffer strips of non-crop vegetation can protect trees and later from agricultural runoff.

**Soil Erosion** Non-crop vegetation supports wildlife that might otherwise perish in an agricultural landscape.

**Field Edge Heterogeneity** a trend of increasing field size signals loss of non-crop vegetation and associated wildlife habitat, and may be expected to increase erosion by wind and water.

**Field Size Distribution** a trend of increasing field size signals loss of non-crop vegetation and associated wildlife habitat, and may be expected to increase erosion by wind and water.

**Fields are for crops . . .**

**. . . but landscapes are for all of us.**

**Acknowledgements:** The EMAP Agricultural Land Resource Group thanks the many individuals and organizations that made this effort a success. The individuals are too numerous to mention, but include the USDA Agricultural Research Service, Forest Service, National Agricultural Statistics Service, and Natural Resource Conservation Service; the U.S. Environmental Protection Agency, North Carolina State University, University of Maine, Oregon State University, University of Nebraska, and, well, I guess the list of organizations is pretty long, too. 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 Natural Resources Conservation Service, Raleigh NC  
 5. USDA Agricultural Research Service, Raleigh NC

28 March 1997



Where do I begin?



**PREVALENCE OF OBESITY AMONG INNER CITY LATINO CHILDREN AND ADOLESCENTS**

Nazrat M. Mirza 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 children and adolescents in the USA. Of particular significance is the increasing prevalence of obesity and its complications among the Latino population. Among this ethnic group there is a strong sense of family, and children are a priority. Because of the pressures placed on children, there may be a misplaced assumption that children should not be denied food or other basics such as TV. Obesity in children and adolescents is concerning not only because of the associated health and psychological complications, but also because obese children tend to become obese adults. Since obesity is associated with many chronic diseases, it will have an enormous impact on the health care system.

**Purpose of Study:** To estimate the extent of obesity among inner city Latino children and adolescents (0-18) the overall goal of assessing the need for an obesity intervention program.

**Study Design:**  
 One hundred and twenty five charts of children and adolescents aged 0-18 years were randomly selected from well-child visits to Children's Hospital's Adams Morgan Clinic for the calendar year 2000. This clinic sees an average of 3000/700 patients a month; approximately 90,000 are Latino, predominantly from DC/Silver Spring. Information extracted from the charts included weight, height, blood pressure, Tanner classification, history and physical findings concerning well-child care complications. Body Mass Index (BMI) was calculated from measured weight and height. This analysis was done using SAS version 8.1.

**Results:**  
 The distribution of the study sample is shown in Table 1. About 50% were females. The mean age was 10.4 years with a SD of 3.0 and a range of 0.0 to 16.7 years. The mean BMI was 20.8 with a SD of 3.8 and a range of 13.5-37.8. Overall, 40% of the children and youth were overweight (BMI > 95th percentile) or at risk for overweight (BMI = 85-95th percentile), with an almost equal distribution between the two categories (Table 2). Males were more overweight and at risk for overweight than females, but the gender difference was not statistically significant. The prevalence of overweight was higher for youths ages 10 to 14 years.

**Results continued:**  
 Table 3 shows the distribution of overweight and at risk for overweight by age category. These data show that prevalence of overweight and at risk for overweight is high in children as young as 6-10 years. Although the prevalence of overweight and at risk for overweight was lowest in the age group 6-9 years, the differences were not statistically significant (Fisher Exact Test p=0.81 and p=0.60 respectively).

Adolescent frequency was higher among the overweight than the non-overweight children and youth ( $p<0.008$ , Fisher Exact Test). There was no difference in the frequency of occurrence of other symptoms such as obstructive sleep apnea, learning difficulties, behavior problems, insomnia, and ADHD between the overweight and non-overweight group. Only 2% of all the overweight children had their cholesterol levels checked. The cholesterol levels ranged from 112-310 mg/dL. Two percent of the children had their serum triglyceride measured, and the range was 175-1770 mg/dL. There was no significant association between overweight and systolic or diastolic blood pressure in this small sample. Only 20% of the overweight children and youth were diagnosed and notification made to their charts regarding their overweight status by their health care providers. There were no referrals for overweight intervention noted in their charts.

Variable	Frequencies (%)
Gender	50.2
Male	50.2
Female	49.8
Age Category (years)	n=125
0-5	24
6-9	27.2
10-12	24.8
13-14	18.4
15-18	12.8
Total	100

BMI Category	Frequency (%)
All BMI for overweight (BMI > 95 <sup>th</sup> )	20.8
1. Male (n=62)	23.4
2. Female (n=63)	19.1
Overweight (BMI, 85 <sup>th</sup> Percentile)	22.8
1. Male (n=59)	24.1
2. Female (n=60)	20.9

Age Category (years)	All BMI for Overweight (%)	Overweight (%)
(n=50)	(n=50) (85-95 <sup>th</sup> %)	(n=50) (95 <sup>th</sup> %)
0-5	30.0	30.0
6-9	28.4	21.4
10-12	9.1	16.2
13-14	36.7	27.8
15-18	24.9	25.9
Total	25.0	26.2
n=6	35.0	44.4

**Conclusion & Recommendations:**  
 The prevalence rate for overweight and at risk for overweight among children and youth in this inner city Latino community is more than twice the national average. Primary health care providers must be educated and informed the presence of obesity and overweight in children and adolescents early and provide appropriate management of the problem. Targeted interventions and prevention strategies for overweight and obesity in children and adolescents are urgently needed for this population.



I'm feeling  
sleepy



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

Steven R. Garfin<sup>1</sup>, M.D., Isidor H. Lieberman<sup>2</sup>, M.D., Mark A. Riley<sup>3</sup>, M.D., Joseph M. Lane<sup>4</sup>, M.D., Frank M. Phillips<sup>5</sup>, M.D., Helmut S. Mathews<sup>6</sup>, M.D., Hansen A. Yuan<sup>7</sup>, M.D., Burton H. Sachar<sup>8</sup>, M.D., for the Kyphoplasty Study Group  
 University of California, San Diego, Medical Center, San Diego, CA; Cleveland Clinic, Cleveland, OH; Berkeley Orthopaedic Medical Group, Berkeley, CA; Hospital for Special Surgery, New York, NY; University of Chicago Spine Center, Chicago, IL; Mid-Atlantic Spine Specialists, Richmond, VA; State University of New York Health Sciences Center, Syracuse, NY; Albany Medical Center, Albany, NY

### BACKGROUND

- 300,000 VCFs per year
- 215,000 diagnosed, 160% due to pain
- Spinal deformity associated with:
  - Significant morbidity
  - 22% increased mortality (Kado, Ann Int Med 1999)
- Current treatments ineffective:
  - Open surgery fail
  - Medical management palliative
- Vertebroplasty:
  - Bilateral transpedicular cement fill
  - Relieves pain
  - Requires high pressures and runny cement
  - High risk of cement leak
    - Up to 73% where documented (Mirel et al., Radiology 1997)
  - Major complications (Chase, J Int Neurosci 1997)
    - 1.3% in subarachnoid
    - 10% in metastatic cancers

### KYPHOPLASTY

Kyphoplasty is a minimally invasive orthopaedic 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 radiopaque 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 to 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 fine manual control and low pressure. The steps of Kyphoplasty are illustrated in Fig 3.

Fig. 1 Kypho™ Inflatable bone tamps (BT)  
 Created in the U.S. for the reduction of fracture-related creation of a void in cancellous bone

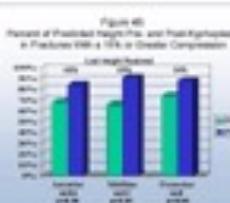
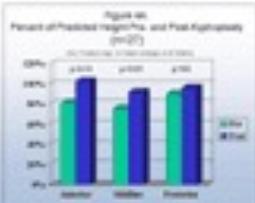


Fig. 2  
 External Transpedicular Fracture Reduction with the BT

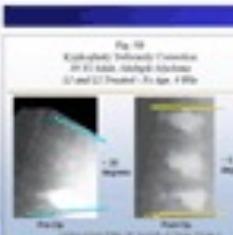


### STUDY DESIGN AND METHODS

A retrospective multi-center review to assess early outcomes with Kyphoplasty. Pain was localized by physical examination. The presence of marrow edema and collapse was confirmed on MRI. General or deep local anesthesia was chosen based on anatomy, number of levels and patient status. The first 150 patients at our centers were asked to characterize their back pain as improved, the same or worse 24 hours post-op and at last 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 there had lost 10% 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 (MAM) are used to show an example height restoration (Fig. 5A) and deformity correction (Fig. 5B). Device-related major complications from all procedures are reported. PMMA leaks in the first 70 procedures performed by one surgeon (HL) were assessed with X-ray and MRI.



### PRELIMINARY RESULTS

107 Vertebrae Treated	
Age at treatment	61 months
Range 11 days to 7 years	
Sex	
Male patients (n=53)	
Average age 46 months	17
Female patients (n=54)	
Average age 50 months	31 (range 11-71)
Average time between 1st and 2nd (range 3-94)	
More than 10% increase in height	
Mean increase	
10% average improvement in height	
30-40% reduction of height loss (Figs. 4A, 4B, 5B)	
No increased incidence of adjacent lesions	
10% above mid-thoracic vertebrae	
Locations	
Lumbar	
Torso	
Trunk	
Spine	
Other	
0-10% above lumbar/ thoracic junction	

### 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 months 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.



OK, but  
copy needs  
to be cut!



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 specific rules and character before you start your poster (e.g. maximum post size/landscape/portrait orientation).  
The suggested poster template is A0 (84.1cm wide), landscape (horizontal) and does not change its page size; UoM can scale it to a smaller or larger size when printing. You need a clear space (with either a portrait/vertical) or a square poster template.  
Bear in mind you cannot exceed the page size allocated by some conference organizers (e.g. 84.1cm width in the UK). Don't make your poster bigger than necessary (and not height).

## Aim

How does this poster template ...  
Simply highlight text and replace by typing in your own text. Copy and paste your content in a MS Word document to Power Pointable presentation.  
The box boundaries should be between 25 and 32 pixels thick, white or black.  
Keep your text aligned to the right, left, top or bottom. The background of the poster can be changed to another colour of your choice.

## Method

Tips for making a successful poster ...  

- Rewrite your paper in poster format. Simply reworking and distilling.
- Headings and other titles should be in upper and lower case, not all capitals.
- Keep word references in capitals or underlines stress your purpose – bold characters (bold, italics).
- When laying out your poster leave breathing space around text. Don't overcrowd your poster.
- Try using photographs or colour graphics. Avoiding numerical tables.
- Spell check and get someone else to proofread.



## Results

Importing/Inserting files ...  
Images such as photographs, graphs, diagrams, logos, etc. can be added onto your poster.  
To insert scanned images into your poster go through them and add them in Insert>Picture From File ... then follow your computer's software to press OK.  
The best type of image file to use are JPEG or TIFF, JPEG is a popular format.  
Beware – other image types and importing. The average colour photo (1x 8cm at 180 dpi) would be about 1MB (1Mb = 8Mbytes). Call MU storage.  
Do not use images from the web.

### Graphics

For simple graphs use MS Excel, or photograph directly in Power Point.  
Graphs come in a scientific graphing programs (e.g. Sigma Plot, Prism, SPSS, ...), should be saved as JPEG or TIFF if possible. For more information see MU.

### Tables

For simple tables use MS Word, or photograph directly in Power Point.

### Text

Experiments are as follows ...  
Detailed, accurate and relevant text is required if a poster is to be effective. Content can be arranged in columns or rows. Content can be arranged in columns or rows. Content can be arranged in columns or rows. Content can be arranged in columns or rows.

### Text

Experiments are as follows ...  
Detailed, accurate and relevant text is required if a poster is to be effective. Content can be arranged in columns or rows. Content can be arranged in columns or rows. Content can be arranged in columns or rows.

## Printing and Laminating

Once you have completed your poster using know how MU for printing, MU will produce A3 size prints for you to check and proofread. The final poster will then be printed and laminated.

How? Don't save your poster until the last minute. Allow adequate working days before you need to print.

Simply highlight text and replace.

## Costs

For poster printing and laminating charges contact MU.



Perfect!



# CornellEngineering

*A Large-Scale Public Library Renovation in Taiwan*

**A Large-Scale Public Library Renovation in Taiwan**

**Library Association of R.O.C.**  
**National Taichung Library of Science**

**ABSTRACT**

There are 301 public libraries, including county, city, town, and village public libraries, in Taiwan. As most of them were built in 1980s, they are not fit in the digital environment to meet users' needs.

In order to upgrade the quality of public library services in Taiwan to meet users' needs and to fulfill 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 301 public libraries.

National Taichung Library was designated as coordinate library to execute the project from February 2003 to June 2004. 301 public libraries were divided into eight groups according to the geographical areas, and a steering committee was formed, consisting 96 committee members from the fields of library and information science, architecture, space design, literature, and history. 96 committee members were assigned to one of eight groups of 301 public libraries to help and to give suggestions of renovation, improvement, replacement, service progress 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 301 public libraries in Taiwan. The contents of the posters will be explained by words, pictures, and statistical tables.

**Keywords:** Public Libraries  
<http://www.ntl.gov.tw>

**Background**

With the fast development of modern information, public libraries need to undertake essential upgrading projects to meet the needs of the society. In Taiwan, there are 301 public libraries, which are mainly run by local governments. The government has been making efforts to improve the quality of public libraries. The "Large-Scale Public Library Renovation Project", was carried out in 301 public libraries. This research studies the situation of each group and discusses the renovation, improvement, replacement, library management, and services of 301 public libraries. The main purpose of this research is to provide useful information for the government to make a better decision in the future.

**Figure 1: Number of Public Libraries in Taiwan**

Category	Number	Percent	City libraries	County libraries	Village libraries	Total
Public libraries	301	100%	31	33	237	301
Source: National Institute of Statistics and Geography, Statistical Yearbook, 2003						

**Figure 2: Number of Members of Each Administrative Level Involved in the renovation project**

Approximate data from Figure 2:  
Provincial level: 240  
County level: 240  
City level: 240  
Township level: 120

**How to achieve the project**

**Planning and Preparatory Phase (February 2003-June 2004)**

- Establish a steering committee to coordinate the renovation project.
- Formulate a renovation plan for each library based on its characteristics and needs.
- Organize a renovation committee for each library.
- Identify key issues and challenges in library renovation.
- Develop guidelines and standards for renovation.
- Monitor and evaluate the progress of the renovation project.

**Implementation and Construction Phase (July 2004-June 2005)**

- Carry out the renovation work according to the plan.
- Provide technical support and resources for library staff.
- Monitor and evaluate the construction progress.
- Address any problems or challenges that arise during construction.

**Evaluation and Feedback Phase (July 2005-June 2006)**

- Conduct a final evaluation of the renovation project.
- Collect feedback from library users and staff.
- Identify lessons learned and areas for improvement.
- Update the renovation plan for future reference.

**Post-Renovation Phase (July 2006-Present)**

- Provide ongoing support and resources for library staff.
- Monitor and evaluate the long-term impact of the renovation.
- Address any new challenges or issues that arise.
- Update the renovation plan as needed.

**Photos: Before**

**Photos: After**

**Photos: Services**



Oh my gawd!

## WHICH IS MORE IMPORTANT: NUMBER OF PATCHES OR CONNECTIVITY?

Darin Kalisak, PBS Student

mailto:dkalisak@cornell.edu

### INTRODUCTION AND OBJECTIVES

Population dynamics is a field of biology that studies the effects of different environmental factors on the population size. In particular, it is concerned with the population's birth rate and death rate. It is also concerned with the population's migration and emigration.

Population dynamics is important because it helps us understand how different factors affect the population. For example, if the population is decreasing, we can analyze the reasons behind it and take steps to prevent it from happening again.

The goal of this project is to investigate the relationship between the number of patches and the connectivity of patches. We want to know which factor is more important for the survival of the population.

### THE PROGRAM

#### ASSUMPTIONS AND LIMITATIONS

A single population patch is added at a time until the entire system reaches equilibrium. This may not be true in reality, but it is a simplification for the sake of the model.

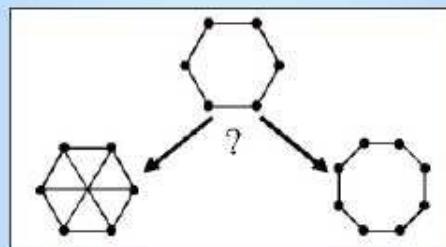
Migration rates between adjacent patches are constant. This assumption is made to simplify the model and focus on the interaction between adjacent patches.

Birth and death rates are constant across all patches. This assumption makes the model easier to analyze.

The model does not consider the effect of different populations on each other.

The model assumes that there is no migration between adjacent patches. It is a valid assumption because it is a simplification of the real world.

### THE ISSUE



A single population is a collection of discrete population patches, in which individual patches may typically be small and far apart. As the long-term stability of the ecosystem is helped more by adding new patches or by increasing the number of migration pathways between existing patches?

Adding patches increases the overall population of the ecosystem, and makes a total extinction less likely by increasing the diversity of patches which would have to go extinct.

Adding migration pathways can help the likelihood of coexistence of mutant pathways by giving them patches from which to escape.

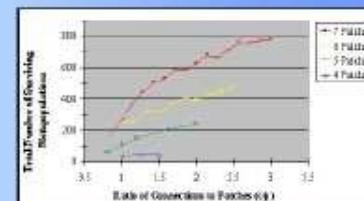


### RESULTS

Model of the model by running simulations while manipulating parameters:

- number of patches values: 5, 6, and 7
- connectivity values: 1, 2, and 3
- the rate of migration pathways to number of patches: 0.05
- two-step mutation probability of 0.1, 0.2, and 0.3
- three-step mutation probability of 0.1, 0.2, and 0.3

The main conclusion of these simulations is that the migration pathways and the total number of patches have a large impact on the survival of the population. For example, if I increased the number of patches, the survival rate increased from 0.2 to 0.5. Conversely, if I reduced the number of patches, the survival rate decreased from 0.2 to 0.1. This means that increasing the number of patches tends to increase the survival rate of the population, while reducing the number of patches tends to decrease the survival rate of the population. In every case, the migration pathways, the number of patches, and the mutation rates all had a significant impact on the survival rate of the population.



### CONCLUSIONS

The results of this model indicate that when properly implemented, migration pathways can help the survival of the ecosystem. The number of patches and the rate of migration pathways are important factors in determining the survival rate of the ecosystem. These additional pathways are relatively inexpensive to implement, however, they do not have a significant impact on the overall survival rate of the ecosystem.

It is interesting that in our model, the connectivity and the number of patches are more important than the birth rate. It suggests that the number of patches and the connectivity of the patches are more important than the birth rate. This means that increasing the number of patches and the connectivity of the patches can help the ecosystem survive longer.



Nice flow,  
but a lighter  
background  
for reading

**Fusing  $^{18}\text{FDG}$ -hybrid PET To CT Images Significantly Alters Treatment Planning In The Radical Treatment Of Non-Small Cell Lung Carcinoma**

Y.C. Ling, M.D., C.B. Caldwell, Ph.D.,<sup>1</sup> K. Mah, M.Sc., C.E. Danjoux, M.D., J.M. Balogh, M.D., S.N. Ganguli, M.D.,<sup>1</sup> R.G. Tissu, B.Sc., and L.E. Harlich, M.D.<sup>1</sup>  
 Toronto-Sunnybrook Regional Cancer Centre, Sunnybrook and Women's College Health Sciences Centre,<sup>1</sup> and University of Toronto, Toronto, CANADA

**Abstract**  
 A prospective clinical study was conducted to determine the impact of integrating  $^{18}\text{FDG}$ -hybrid PET images with CT images on treatment planning for non-small cell lung carcinoma (NSCLC). Patients were treated with definitive radiation therapy to gross tumor volume (GTV) and clinical target volume (CTV) using three-dimensional conformal radiotherapy (3D-CRT). All patients received concurrent chemotherapy and radiotherapy. Radiotherapy was planned by the treatment team. In total, 100 patients were included in the study. All patients had a minimum of one year of follow-up. The primary endpoint was the percentage change in the gross tumor volume (GTV) plan by 10% or more. The secondary endpoints were the number of patients who required dose modification and the number of patients who required dose reduction.

**Potential of  $^{18}\text{FDG}$ -hybrid PET for Radiation Therapy Planning**  
 $^{18}\text{FDG}$ -hybrid PET (FDG-PET) is a glucose analog that is metabolically trapped in cells. Many malignant tissues are associated with increased glycolysis and thus demonstrate increased uptake of FDG. In lung cancer imaging, FDG-PET has proven to have greater sensitivity and specificity than CT<sup>1,2</sup>. In radiation planning, it may help to distinguish normal tissue, often present even in advanced disease. As a functional imaging modality, FDG-PET may complement the anatomical data from CT.

**Impact of FDG-hybrid PET on Patient Management**  
 In 1/26 (3%) patients, radiation therapy was changed from radical to palliative intent.

**Impact of Co-registered FDG-hybrid PET on PTV Coverage**  
 In 9/21 (43%) patients, the volume of PTVs were reduced by at least 50% of the prescribed dose with the CT-only-based plan.

**Impact of FDG-hybrid PET on Spinal Cord Dose**  
 In 10/20 (50%) cases, the maximum spinal dose was reduced by more than 200 cGy with CT-PET data.

**Discussion**  
 The impact of integrating  $^{18}\text{FDG}$ -hybrid PET with CT images was assessed in terms of patient management, PTV coverage, and maximum spinal cord dose in eight sites. In 1/19 (5%) of patients, FDG-PET resulted in a change in management to palliative intent. In 9/21 (43%) cases, plan modification was resultant in significant sparing of normal tissue, and in 10/20 (50%) the spinal dose was reduced by 200 cGy or more. The impact on dose sparing based on these results, although promising, may be limited, given the inherent artifacts often seen with integrated images. These data should inform the use of CT-PET data.

In the future, plans may become more important for the PTVs, modified independently by two physicians and would facilitate the process. Radiation planning results can now and should still be able to play a role in reducing planned variations in radiation.

**Conclusions**  
 The fusion of  $^{18}\text{FDG}$ -hybrid PET images with CT planning images significantly altered treatment plans in 88% of our cases. Integration of  $^{18}\text{FDG}$ -hybrid PET into fusion CT-PET images improves the precision of the treatment plan. The integrated images are an efficient, reliable, and cost-effective way to improve the quality of radiotherapy.

**References**  
 1. Ling YC, et al. Int J Radiat Oncol Biol Phys 2000;57:113-119.  
 2. Ling YC, et al. Int J Radiat Oncol Biol Phys 2000;57:120-126.

**Acknowledgements**  
 We thank Dr. G. Goss for his support and advice. We also thank the staff of the Toronto-Sunnybrook Regional Cancer Centre for their support.



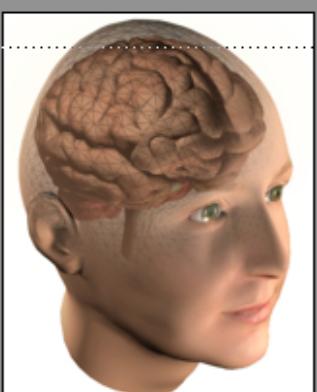
I've fallen,  
 and I can't get up



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

Themanameoftheauthor 22pt 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



Use picture of the actual  
huge caption 22pt regular

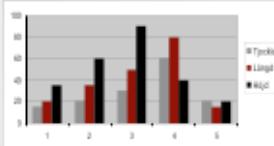
**Introduction**  
Posters are primarily visual presentations. Your poster should be dominated by self-explanatory illustrations such as graphs and pictures while the amount of text should be kept to the minimum..

**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.

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Contact [Mediahavet](#) at University Library for help with layout and image enhancement. For printouts and professional photographers contact [Bildmekarna](#). For more information: [www.bildmekarna.vith.se](http://www.bildmekarna.vith.se)

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Always write a descriptive caption 22pt 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 ~~Mundo~~ 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.



Karolinska Institutet, 22pt regular  
Poster design: Maria Karlsson  
Söder

Väg 1, 171 51 Stockholm, Sweden  
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mailto:[maria.karlsson@ki.se](mailto:maria.karlsson@ki.se), <http://ki.se>



## Gorgeous!



# CornellEngineering

## LESSONS LEARNED FROM AIRWAY PRESSURE RELEASE VENTILATION (APRV)

Lewis J. Kaplan, MD<sup>1,2</sup>, Heatherlee Bailey, MD, FAAEM<sup>2</sup>

Medical College of Pennsylvania-Hahnemann University

Departments of Surgery<sup>1</sup> and Emergency Medicine<sup>2</sup>, Philadelphia, PA USA

### INTRODUCTION

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

### METHODS

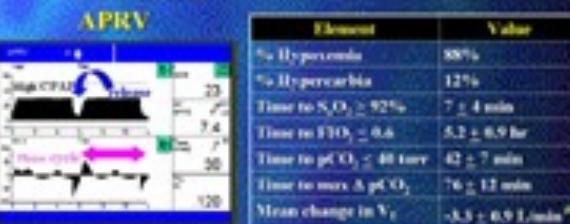
Consecutive patients transitioned from either volume or pressure-targeted ventilation to APRV (Dräger Evita 4 Pulmonary Workstation) at a University hospital surgical ICU were retrospectively reviewed. Patients initially ventilated with APRV were excluded. Initial APRV settings to correct hypoxemia ( $\text{pO}_2 \geq 60 \text{ torr}$  on  $\text{FiO}_2 \geq 0.9$ ) were a  $\text{P}_{\text{high}}$  at the prior plateau pressure, a  $\text{T}_{\text{high}}$  of 6.0 sec and a  $\text{T}_{\text{low}}$  of 0.8 sec. Hypercarbic ( $\text{pCO}_2 \geq 55 \text{ torr}$  and  $\text{pH} \leq 7.3$ ) patients were set with  $\text{T}_{\text{high}}$  of 5.0 sec and a  $\text{T}_{\text{low}}$  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  $p < 0.05$  ( $^{\text{a}}$ ).

### RESULTS

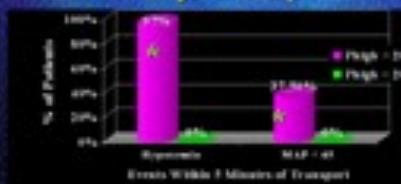
#### Demographics



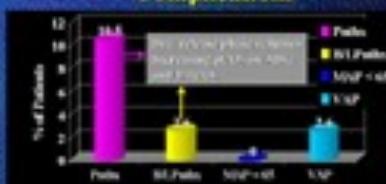
#### APRV



#### Transport Safety



#### Complications



### CONCLUSIONS

1. APRV is a safe rescue mode for hypoxic or hypercarbic respiratory failure and requires a significantly lower  $\text{V}_\text{E}$  than conventional ventilation.
2. Decreasing release phase volumes and a rising  $\text{pCO}_2$  are strong indicators of pneumothorax in a patient on APRV. Routine end-tidal  $\text{CO}_2$  monitoring is recommended.
3. Preparation for safe intra-hospital transport may be keyed to the  $\text{P}_{\text{high}}$  required for oxygenation and ventilation. Patients requiring a  $\text{P}_{\text{high}} > 20 \text{ cm H}_2\text{O}$  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 content against the publication of above documents before you are publishing. In-house printing University print crews.

The pages of the poster must be scanned at 300 dpi. Do not change the paper size or add a border to your poster. If you have a different paper size, add a page header and footer to your poster.

Save files as .pdf or .psd (please do not use .ai). Save files as .pdf or .psd (please do not use .ai). Save files as .pdf or .psd (please do not use .ai).

**AIM**

No unnecessary postscript.

Simply highlight the text and replace by clicking in your text, or copy and paste content from a Microsoft document or PowerPoint presentation.

The additional text can be removed by clicking on the 'Delete' button.

The day will be the date between 20 and 24, October 2011.

Keep text as brief as possible.

The background of these slides are powerpoint can be changed to standard backgrounds.

**Methods**

Tip for creating a successful poster:

- Be clear and purposeful.
- Simply everything and avoid clutter.
- Headings of Research & aims should be kept to a maximum of 100 words.
- Never abbreviate unless it is common knowledge.
- Use bold typeface for headings.
- When listing our contributions, keep space around your text for a question and answer session.
- Try using photographs and graphs. Avoid long narrative text.
- Spell check any graphics and documents.

**Results**

**Importing a Word file**

Import each as photographs, graphs, diagrams, logos, etc, can be saved to your poster.

To insert a word image incorporate it through the menu at Microsoft Word's Insert Picture File... then the click on the crop tool, click it, and press OK.

The best way to import is to save as JPEG or TIFF, if you like the poster better.

Remember, all of the images you are importing, The background photo is also a right-click to select Shift+Alt+PrintScreen key and Ctrl+H to remove.

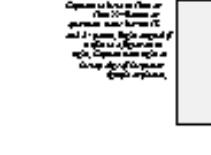
Do not use large fonts in the text.

**How about graphs**

For displaying graphs use Microsoft Excel, creating graph ready to print.

Graphs made in scientific plotting programs like Sigma Plot, Prism, SPSS, Matlab, etc should be saved as JPEG or TIFF (possible for non-linear color and HSL).





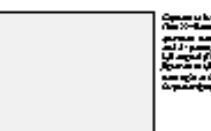
**Printing and Ordering**

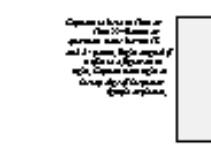
Choose how you complete your poster; bring it to a local printer. We will provide 30 standard print crews located around the world. The final poster will then be printed and delivered.

From Domo International you can receive 100x or 1000x quality and delivery to your door.

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**Conclusion**

For communication or Powerpoint, Scanning and Digital Photography, and Images.

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**Acknowledgements**

Simply highlight the text and replace by clicking in your text, or copy and paste content from a Microsoft document or PowerPoint presentation.



This  
works!

# LiLynn Graves

College of Engineering Webmaster

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[engineering.cornell.edu/\*\*poster-design\*\*](http://engineering.cornell.edu/poster-design)

## Great Resources

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

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

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