

Creating a scientific poster

Dani Or

Department of Environmental Systems Science (D-USYS)
Swiss Federal Institute of Technology, ETH Zurich



Outline

- Poster – visual communication
- From planning to printing – main steps
- Structure and tips - examples
- Presenting your poster

- Individual task: create your own A₀ format poster on the general topic of:
“Perspectives on climate change”



A poster is a visual communication tool

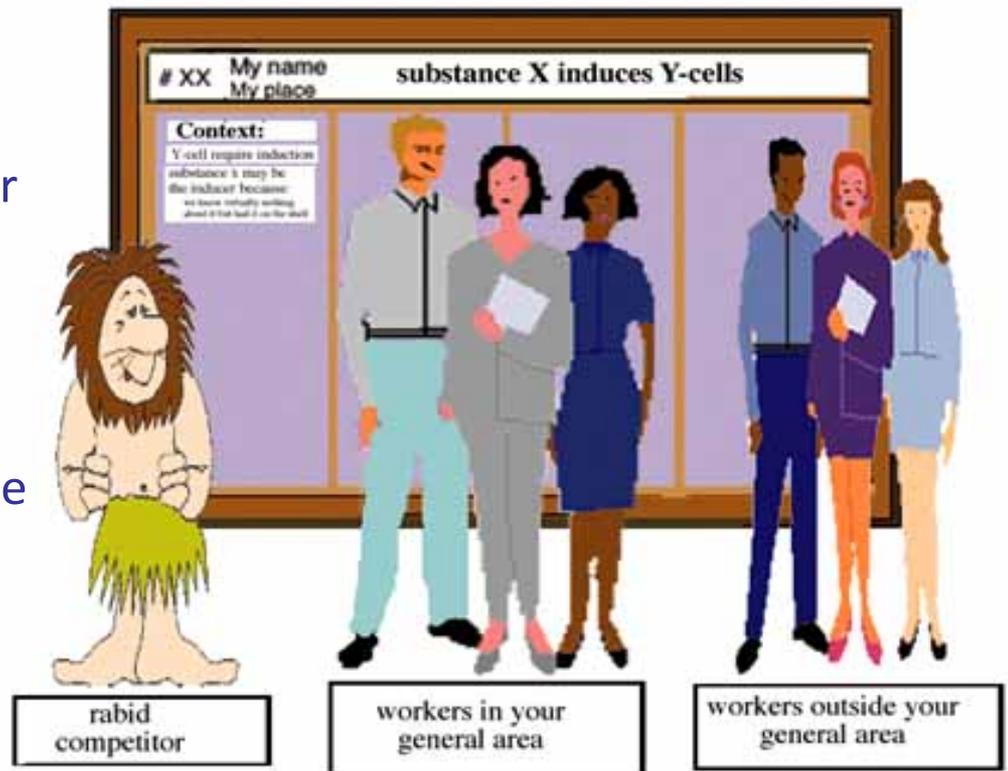
- Focused on a single message
- Lets graphs and images tell the story; uses text sparingly
- Keeps the sequence well-ordered and obvious
- An effective poster operates on multiple levels:
 - initiate discussion/conversation starter
 - provide a brief overview of your work
 - attract attention
 - useful reference when you discuss your work
 - stand alone when you're not available

Poster vs. Presentation

- An effective poster uses visual grammar - it shows, not tells. It expresses your points in graphical terms
- It avoids distracting visual chaos - it guides viewers by using visual logic with hierarchical structure emphasizing main points
- All elements, even figure legends, are visible from 1.5 m away
- It displays the essential content (the messages) - in the title, main headings and graphics. Main points in large type-face headings; details are subordinated visually, smaller type-face
- A poster competes on limited attention of mobile audience (“information shoppers”) – must convey information clearly
- Poster enables interactions and exchange not possible with presentation

Know your audience

- your field of specialization (*they'll be attracted anyway*)
- fields closely related to yours
 - They will require that you supply context for your work
 - They are likely to be unfamiliar with your jargon
- unrelated fields
 - They require you to explain the problem and the solution
 - They will not understand your jargon



Creating an effective poster

- **Planning** - before starting work on your poster, consider message, space, budget, format (single sheet or multi-panel), and deadlines
- **Focus** - stay focused on your message and keep it simple. Create a mock-up and dispense with unneeded details
- **Layout** - use a clearly defined visual grammar to move readers through your poster
- **Headings** - use headings to orient readers and convey major points
- **Graphics** - clear graphics should dominate your poster
- **Text** - should be minimized in favor of graphics, and large where used
- **Color** – make a poster attractive, improve readability (be cautious)
- **Editing** - edit ruthlessly to reduce amount of text and focus on a results-oriented message
- **Software** – several packages can be used to create your poster (*Powerpoint, Adobe*)

Planning

➤ What's my message?

- Everything you include in your poster relates to a clearly crafted message
- You must state your main point(s) and conclusion(s) clearly and succinctly
- All visuals and text should relate to those points and conclusions

➤ How much space do I have?

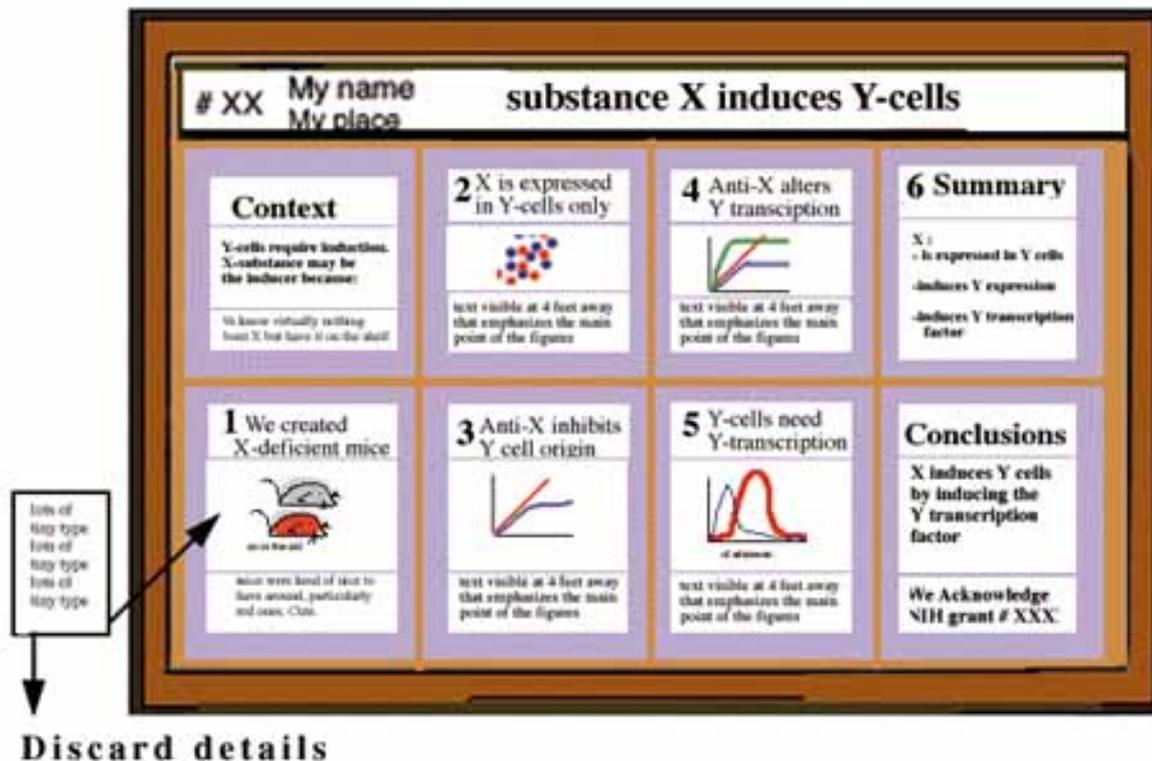
- Determine specific size requirements - visit conference web site or otherwise consult with conference organizers
- Poster area available determines, in part - what you can fit in, the layout (landscape vs. portrait), and how things will be organized

➤ What milestones should I establish?

- Especially important if the poster is multi-authored.
- Start with the due date and work back to create milestones
- Allow time for peer review and heavy editing

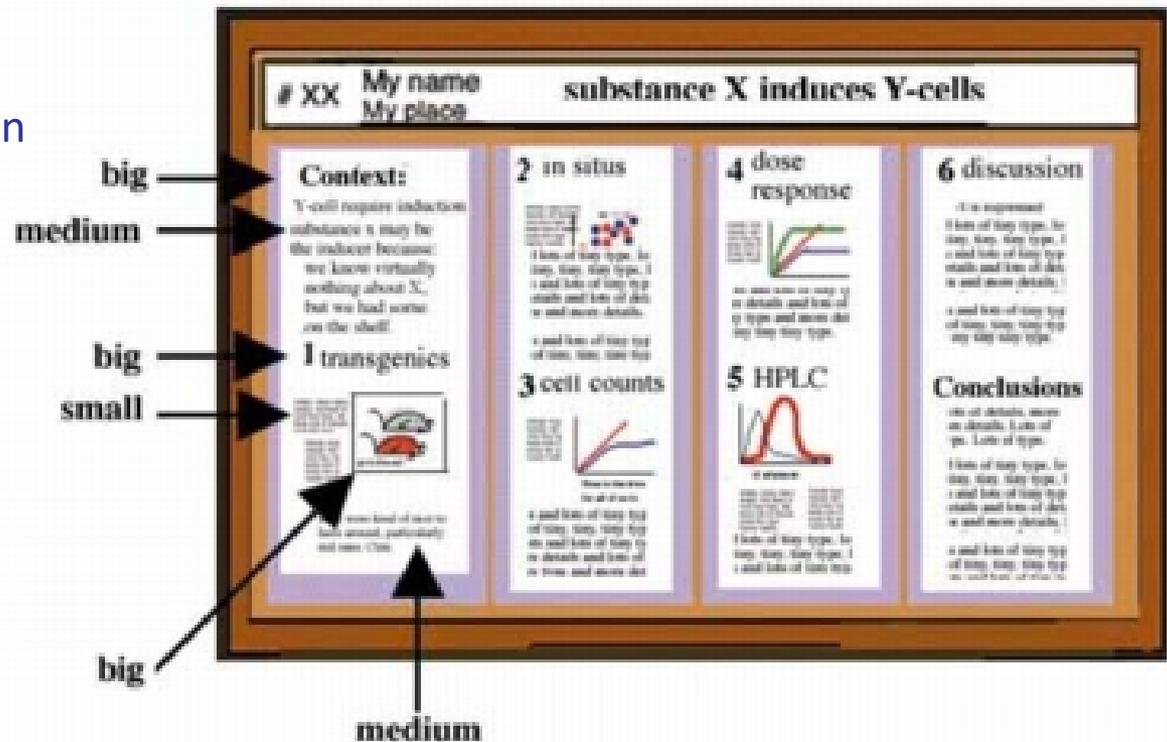
Focus on your message – *keep it simple*

- Ask yourself which details are absolutely essential for conveying your message (*do not focus on the tools & methods*)
- Omit anything that is not essential
- Edit text - simplify wording, reduce sentence complexity

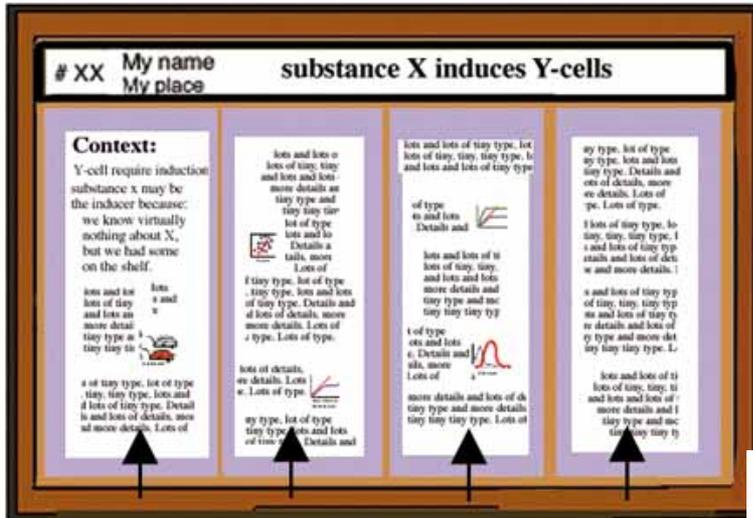


Poster layout (1)

- use visual grammar to guide readers to important parts of your poster
- use columns format to make your poster easier to read in a crowd
- use organization cues to guide readers through your poster
- use "reader gravity" - pulls the eye from top to bottom & left to right
- use headings intelligently to help locate your main points and key information
- balance placement of text and graphics to create visual appeal
- use white space creatively to help define flow of information
- Start with a sketch!



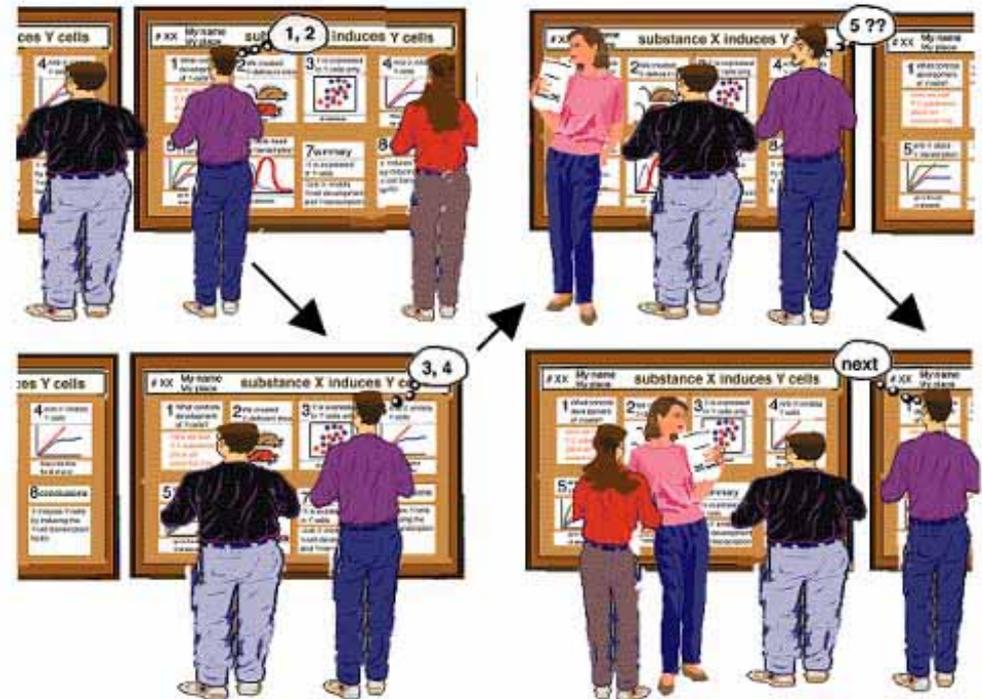
Poster layout – *columnar format (2)*



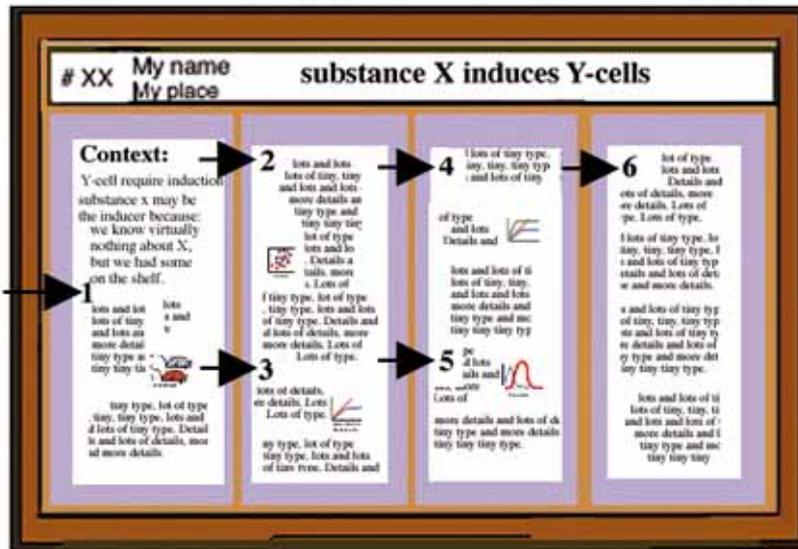
- If a poster is organized in columns, viewers can read all of a column before they move to next column
- Readers tend to read top to bottom, a phenomenon called "reader gravity"

Alternatively:

- Viewers who read the first row might be unable to fight their way back to the beginning
- They will proceed quietly to the next poster



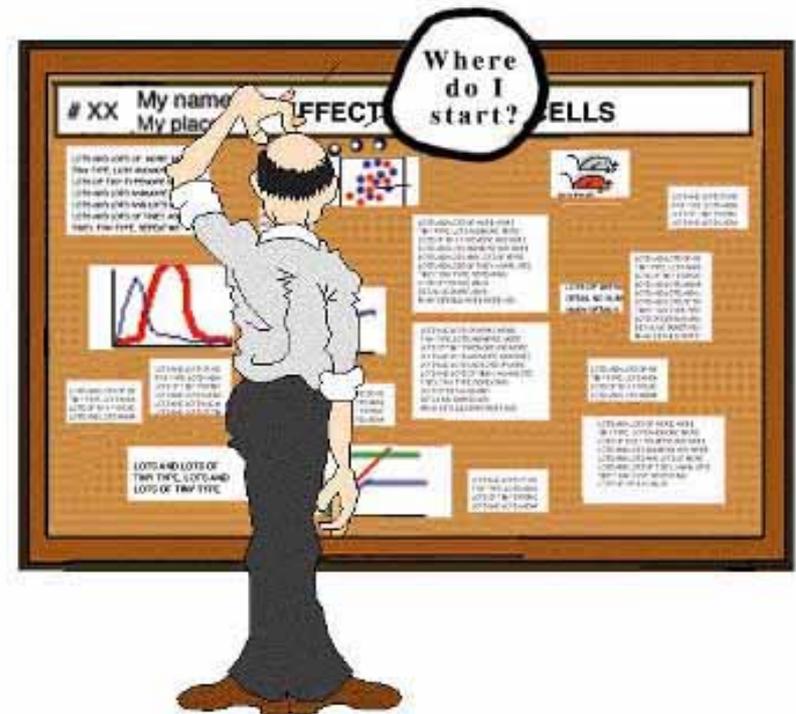
Poster layout – cues help viewers (3)



- Supply cues to help viewers follow your presentation
- Organize visually & in columns
- You can use numbers, letters, or arrows to help guide viewers

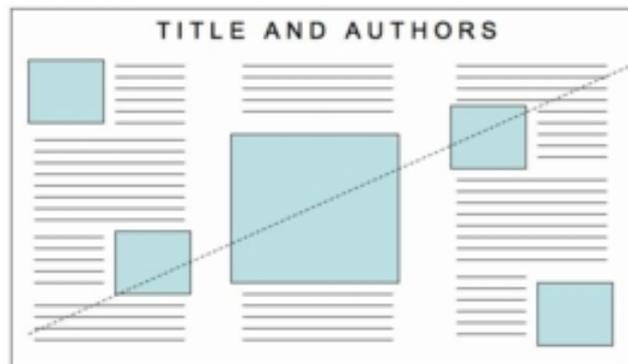
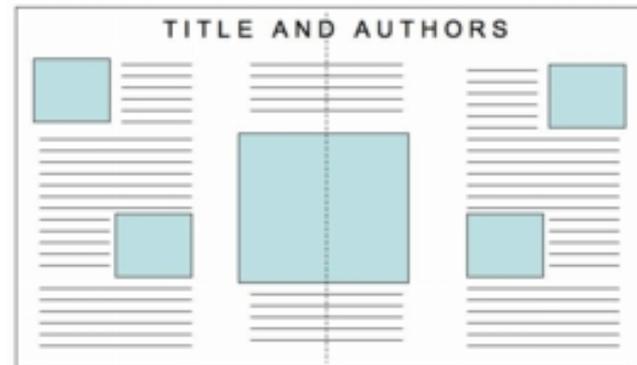
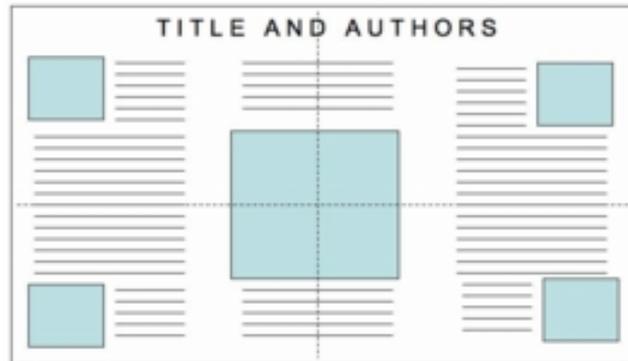
“Alternatively”:

- Organize your poster in a "unique" manner that defies reader gravity and gives readers no idea of organizational flow
- Let viewers guess where to start and where to go next



Poster layout – *balance white spaces* (4)

- Your poster should have a good visual balance of figures and text, separated by white space (avoid overly busy poster!)
- Sometimes balance is attained when images and text are reflected (approximately) across some axis of symmetry (I prefer asymmetry)



Use headings for orientation and summary

- Use headings to summarize your work in large letters
- A hurried reader should get the main points from headings alone
- Good headings are part of visual grammar guiding readers through your poster
- **Be hierarchical** – the more important the point, the larger the type
- **Be bold** - make the strongest statements your research allows

1. Context

- Partial saturation is the common state of natural soils, implying particular **interfaces between water and air**
- **Capillary effects** (water menisci) tend to strengthen the granular material
- Under certain stress ...

2. Model

- Mathematical formulation of the Advanced Constitutive Model for ...

Definition of the **Bishop's generalised effective stress**

$$\sigma' = (\sigma - u_a) + S_r \times (u_a - u_w)$$

With: σ' effective stress
 σ total stress
 S_r degree of saturation = vol. water / vol. voids

Above: Idealised

Headings - *example*

- Note how headings convey the message - viewers in a hurry need not read further (color boxes help clarify the main message)



Can Suburban Greenways Provide High Quality Bird Habitat?

George R. Hess :: NC State University :: Department of Forestry & Environmental Resources :: Raleigh NC 27695-8002 USA :: george_hess@ncsu.edu
 Christopher E. Moorman, Jamie H. Mason, Kristen E. Sinclair, Salina K. Kohut :: NC State University :: Department of Forestry & Environmental Resources
www4.ncsu.edu/~grhess/GreenwaysForWildlife



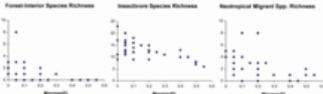
Birds of Conservation Concern in Decline

- Many bird species of conservation concern – including neotropical migrants, insectivores, and forest-interior specialists – decline with increasing human development
- Greenways might mitigate this effect
- Habitat patch size, vegetation composition & structure, and landscape context are key factors
- Standards are lacking for designing and managing suburban greenways as high quality habitat

Breeding Birds of Concern More Common in Wider Greenways with Less Managed Area Surrounded by More Forest Canopy



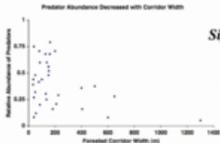
- 8-minute, 50m point counts at center of corridor
- Revisited 4 times during breeding season



Nest Predators Less Common in Wider Greenways with Narrower Paths




- Five baited scent stations along each greenway segment
- Observed for 5 nights each



Significant Predictors for Predator Abundance
Greenway:
 (-) Corridor width (-) Building density
Adjacent Landscape:
 (+) Trail width (+) Mature forest
 (+) Ground cover (-) Vine cover

Objective: Greenways for the Birds

- Determine how development-sensitive forest birds are affected by
 - forested corridor width
 - adjacent development intensity
 - vegetation composition & structure
- Develop recommendations for greenway designers and planners

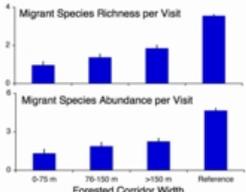
Study Design & Independent Variables

- Sampled 34 - 300m corridors in Raleigh & Cary, NC, USA
- Sampled range of
 - Forested corridor widths (20 – 1,200m)
 - Adjacent density (low density residential – office/commercial)
- Additional measures
 - Vegetation composition & structure in corridor
 - Land cover in 300m x 300m adjacent to corridor (context)
- Measured richness & abundance of
 - Breeding birds
 - Neotropical migrant birds during stopovers
 - Mammal nest predators



Spring Neotropical Migrant Stopovers More Common in Wider Greenways with More, Taller Hardwood Trees

- 200m x 25m transects along one side of greenway path
- Revisited sites for two spring seasons and one fall season
- Width *not* significant, but trend consistent with other findings



Significant Predictors for Breeder Abundance
Greenway:
 (-) Managed Area (+) Shrub Cover
Adjacent Landscape:
 (+) Canopy Cover (-) Building Density (-) Bare Earth

Significant Predictors for Spring Migrant Abundance
Greenway:
 (+) % Hardwoods (+) Canopy Height
Adjacent Landscape:
 (-) Bare Earth

Greenways for Development-Sensitive Forest Birds Might Conflict with Intense Recreational Use

People & Managers Prefer ...



- Good for walking, running, cycling, strollers, wheelchairs
- Easier to maintain, especially with higher intensity use

Forest Birds Prefer ...



- Narrow path avoids splitting forested corridor
- Discourages heavy human use
- Fewer nest predators

Potential Solution: Wide Corridor, Trail Near Edge

- Make corridors at least 50m wide; wider is better
- Don't split forested corridor
 - Keep trails as narrow as possible
 - Avoid wide grassy areas along trails within forested corridor
- Locate trails near the edge of forested corridors

Headings – *example*

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.

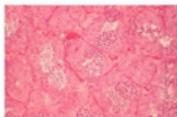
Objective

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

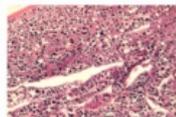
Methods

- Southern flounder broodstock were strip spawned to collect eggs and sperm for *in vitro* fertilization.
- Hatched larvae were weaned from a natural diet (rotifers/*Artemia*) 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

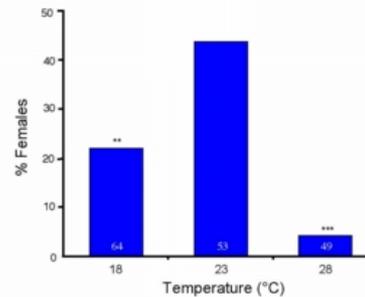


Male Differentiation



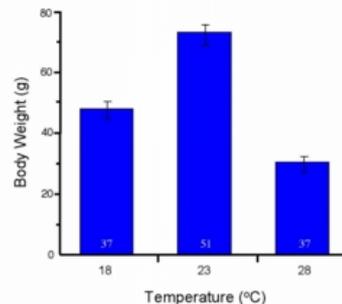
Female Differentiation

Temperature Affects Sex Determination

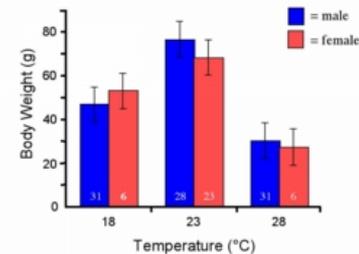


(**P < 0.01 and ***P < 0.001 represent significant deviations from a 1:1 male:female sex ratio)

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) 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.

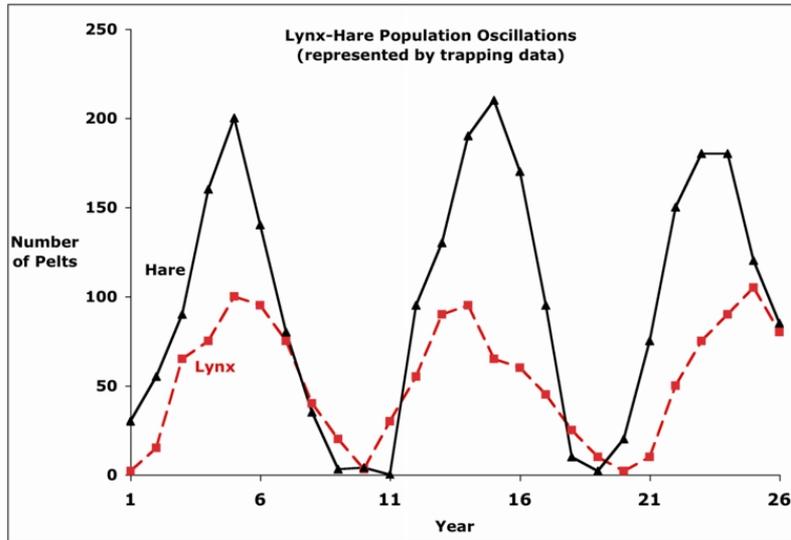
Conclusions

- 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 Saltonstall-Kennedy Program of the National Marine Fisheries Service and the University of North Carolina Sea Grant College Program for funding this research. Special thanks to Lea Ware and Beth Stamps for help with the work.

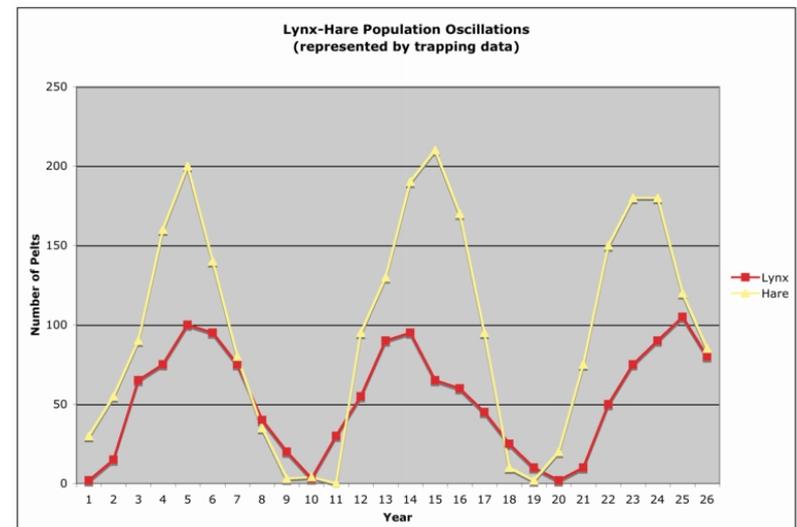
Good graphics – poster centerpiece



- Good graphs communicate relationships quickly
- Graphs should be simple and clean
- Write explanations directly on figures (*less referencing elsewhere*)
- Use simple 2-D line graphs, bar and pie charts; use photos !

“Alternatively”:

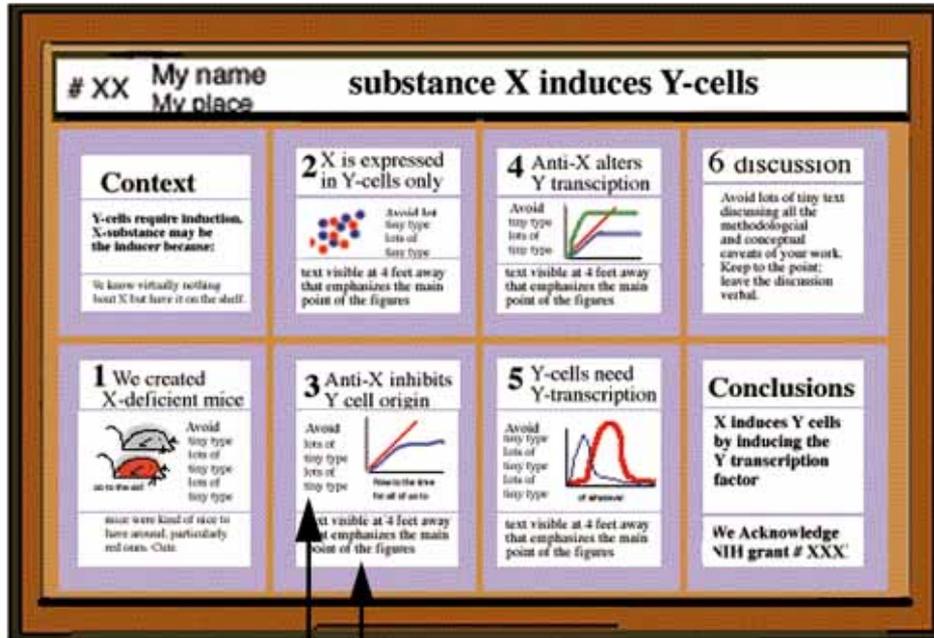
- Too many distractions (too much ink and background that don't add information)



Text should be simple, direct, and large

- Minimize text - *use images and graphs instead*
- Keep text elements to 50 words or fewer
- Use phrases rather than full sentences
- Use an active voice
- Avoid jargon (depends somewhat on audience)
- Left-justify text; avoid centering and right-justifying text
- Select readable font (serif e.g., *Times*) for most text
- Text should be at least 24 point in text, 36 for headings
- Pay attention to text size in figures - it must also be large
- Title should be at least 5cm tall
- Scale the poster to a paper handout – **if you can't read, the font is too small!**

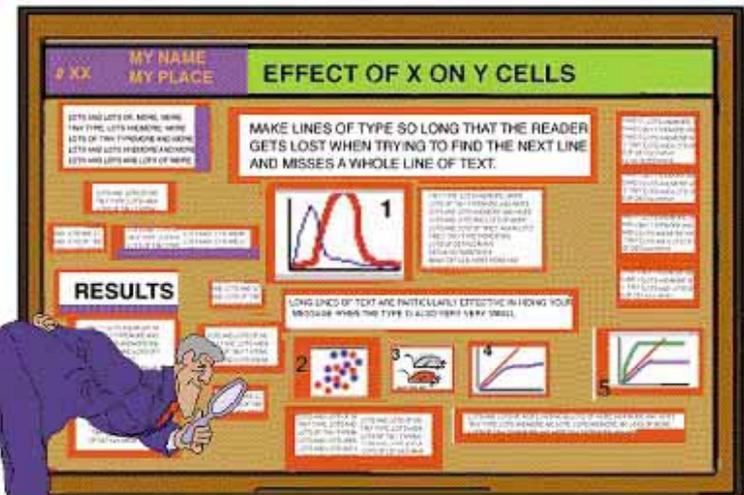
Text should be readable from a distance



Text is readable at a distance

- Title and major headings should be readable from 2m away
- Supporting material should be visible from 1m away
- Avoid long lines of text; keep text blocks compact - single spaced and 50 words or fewer (*separate with white space*)

- Use left-justified text, with ragged right margins, for clean word spacing and ease of reading



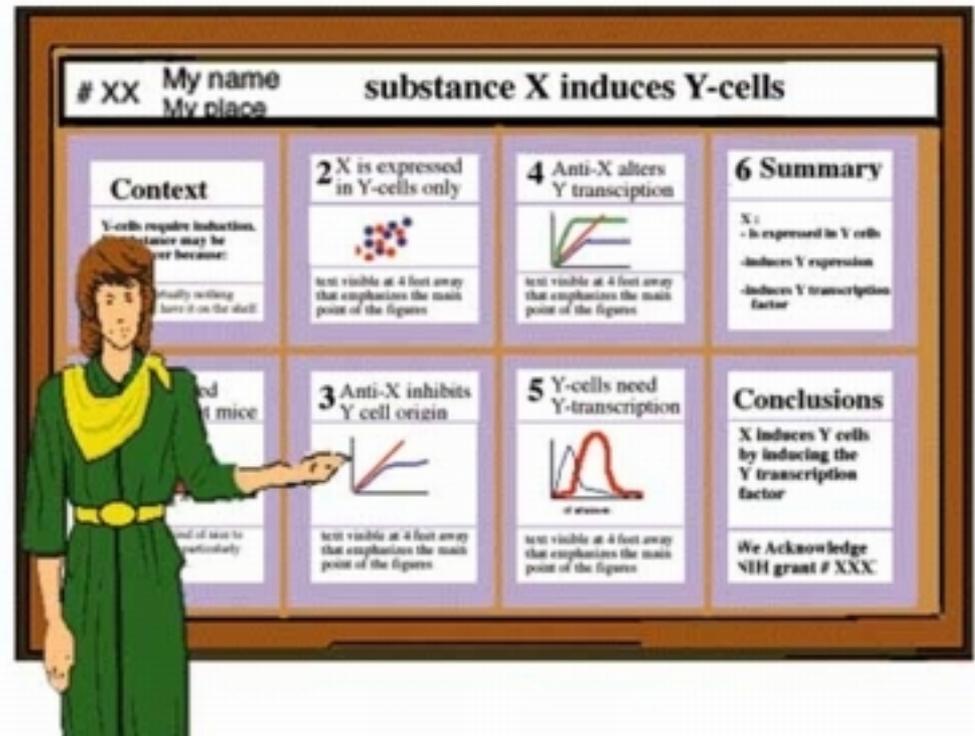
Editing

- If text doesn't provide critical support for your main message, **ELIMINATE IT!**
- Edit all text to simplify verbiage, to reduce sentence complexity, and to delete details
- Have colleagues comment on drafts (print a small version)
- Are your objective and main message obvious?
- Will readers be able to contact you?



Presenting your poster (1)

- Arrive early at the display site
- Unless you're confident the organizers will have proper supplies, bring a poster hanging kit with you
- Hang your poster square & neat
- Make sure you're at your poster during your assigned presentation time
- Put handouts, business cards, reprints nearby



Poster presentation (2)

- Use your poster as a visual aid - don't read it!
- Prepare 1, 2, & 5- minute tours of your poster
- When people ask you for a tour of your poster, use the graphic elements to explain your work
- Face your audience and explain: the problem and its importance, what you did to answer it, what the answer is, and its significance
- As you talk in an audible, measured pace, point to the graphic features that demonstrate your message - to direct viewers' eyes
- (Printing – a few words)



Evaluating criteria (1)

60-Second Poster Evaluation

Copyright ©1999 George Hess - NC State University - Forestry Department

Presenter _____
Poster Title _____
Evaluator _____

Overall Appearance

- 0 **Cluttered or sloppy** appearance. Gives the impression of a solid mass of text and graphics, or pieces are scattered and disconnected. Little white space.
- 1 **Pleasant** to look at. Pleasing use of colors, text, and graphics
- 2 **Very pleasing** to look at. Particularly nice colors and graphics.

White Space

- 0 **Very little.** Gives the impression of a solid mass of text and graphics.
- 1 **OK.** Sections of the poster are separated from one another.
- 2 **Lots.** Plenty of room to rest the eyes. Lots of separation.

Text / Graphics Balance

- 0 **Too much text.** The poster gives an overwhelming impression of text only. **OR Not enough text.** Cannot understand what the graphics are supposed to relate.
- 1 **Balanced.** Text and graphics are evenly dispersed in the poster; enough text to explain the graphics.

Text Size

- 0 **Too small** to view comfortably from a distance of 1-1.5 meters.
- 0.5 **Main text OK, but text in figures too small**
- 1 **Easy to read** from 1-1.5 meters
- 2 **Very easy to read.**

Evaluating criteria (2)

Organization and Flow

- 0 **Cannot figure out** how to move through poster
- 1. **Implicit.** Headings (Introduction, Methods, etc.) or other device implies organization and flow.
- 2. **Explicit** numbering, column bars, row bars, etc.

Author Identification

- 0 **None.**
- 1 **Partial.** Not enough information to contact author without further research. This includes missing zip codes on addresses
- 2 **Complete.** Enough information to contact author by mail, phone, or e-mail without further research.

Research Objective

- 0 **Can't find.**
- 1 **Present,** but not explicit. Buried at end of "Introduction", "Background", etc.
- 2 **Explicit.** This includes headings of "Objectives", "Aims", "Goals", etc.

Main Points

- 0 **Can't find.**
- 1 **Present,** but not obvious. May be imbedded in monolithic blocks of text.
- 2 **Explicitly labeled** (e.g., "Main Points", "Conclusions", "Results").

Summary

- 0 **Absent**
- 1 **"Summary", "Results", or "Conclusions" section present**

Individual task: Create a poster

- Create your own A0 (83x 115 cm) poster on the topic of: **“Perspectives on climate change”**
- You may chose any scientific aspect related to the topic – the poster must be your own original work
- Use PowerPoint to create the poster in columnar format (hints: <http://www.ncsu.edu/project/posters/NewSite/PPTinstructions.html#small>)
- Convert and save as a PDF file with your name as part of the file name

