Preparing Powerful Posters

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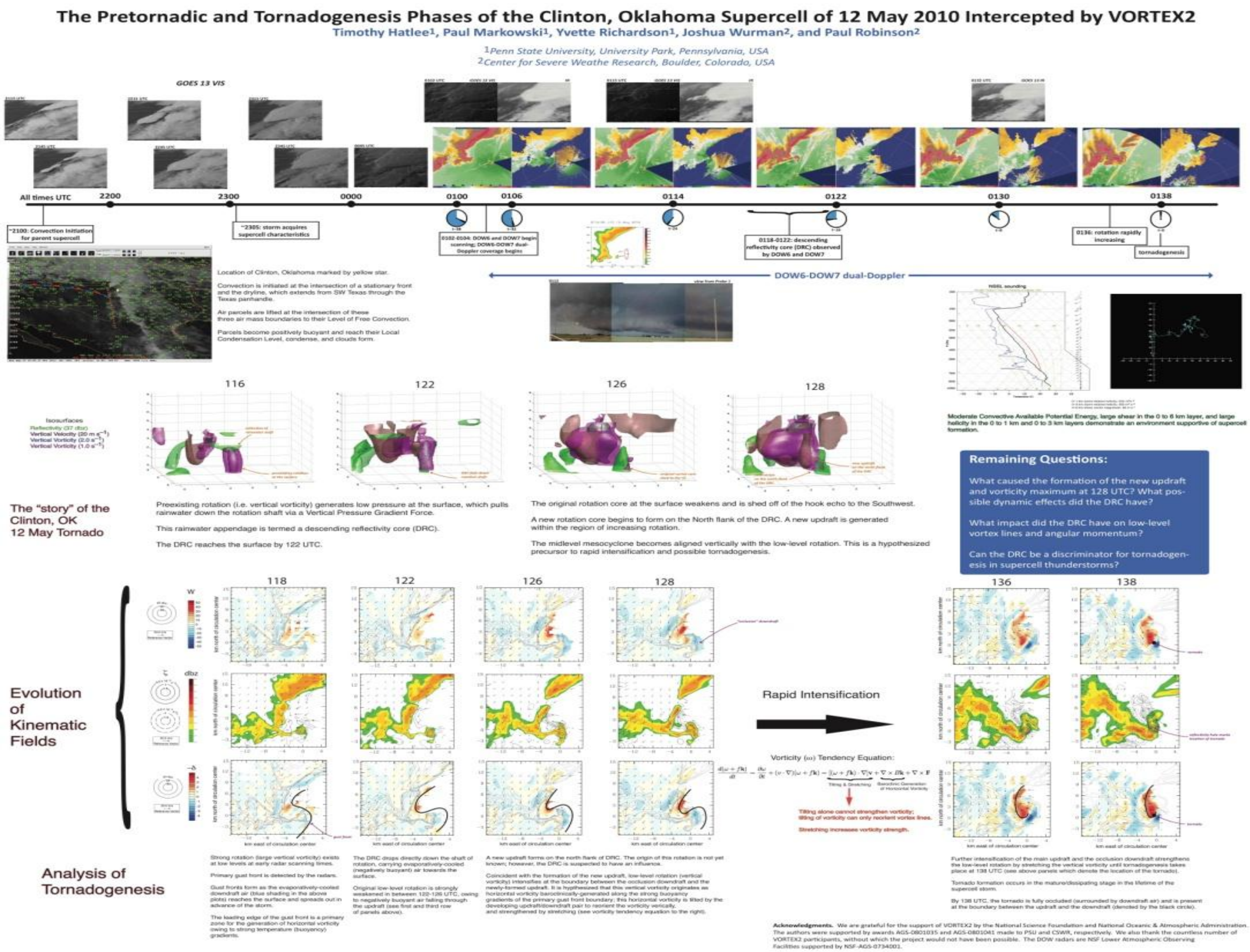
The College of Earth and Mineral Sciences

COLLEGE OF EARTH AND MINERAL SCIENCES

PENNSTATE

1855

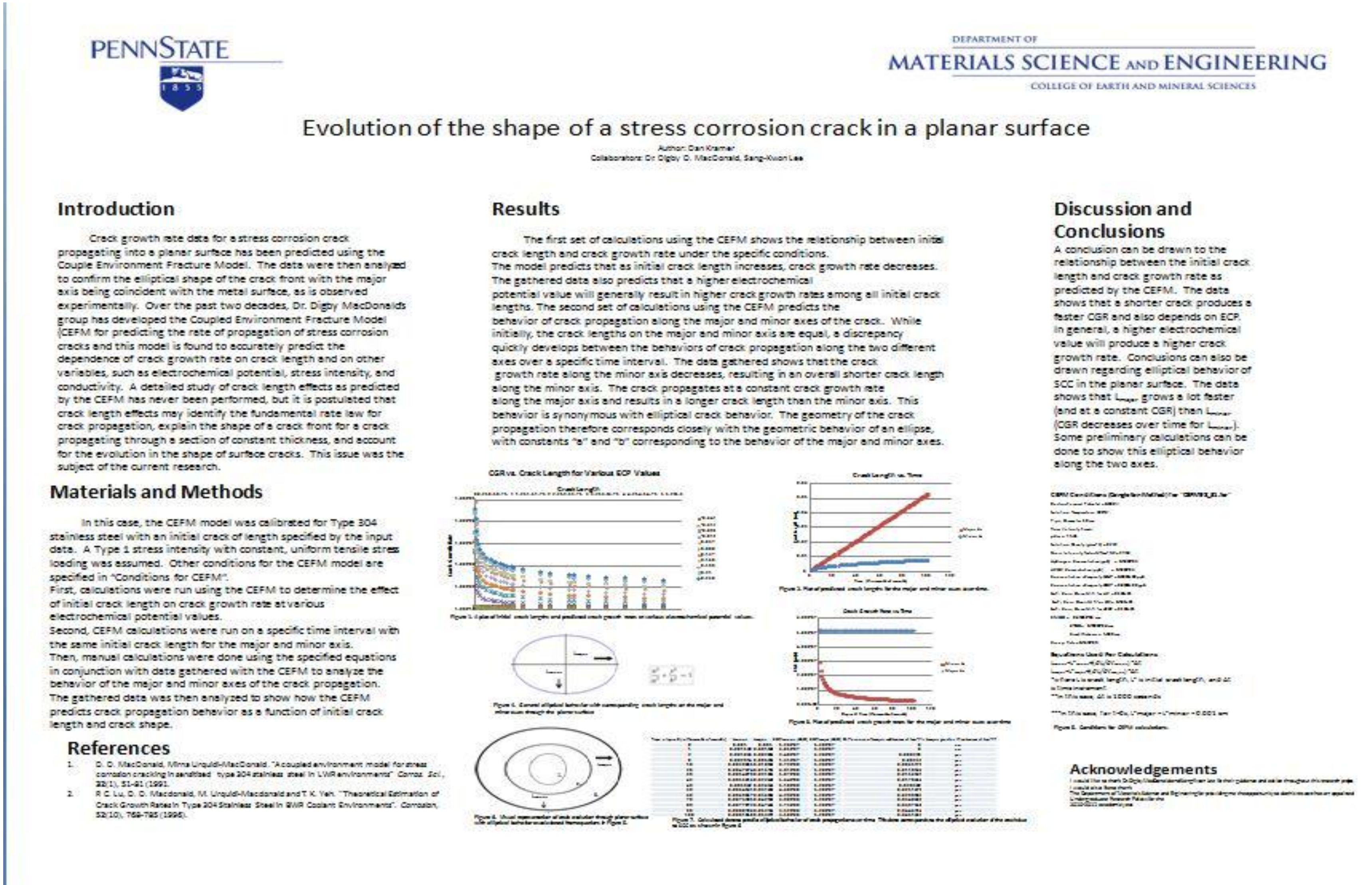
Start With an Example



2011 Award Winning Poster for EMS Graduate Poster Exhibition

Poster by Tim Hatlee

Add Another One



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DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING

COLLEGE OF EARTH AND MINERAL SCIENCES

Evolution of the shape of a stress corrosion crack in a planar surface

Author: Dan Kramer
Collaborators: Dr. Digby D. MacDonald, Sang-Kwon Lee

Introduction

Crack growth rate data for a stress corrosion crack propagating into a planar surface has been predicted using the Couple Environment Fracture Model. The data were then analyzed to confirm the elliptical shape of the crack front with the major axis being coincident with the metal surface, as is observed experimentally. Over the past two decades, Dr. Digby MacDonalds group has developed the Coupled Environment Fracture Model (CEFM for predicting the rate of propagation of stress corrosion cracks and this model is found to accurately predict the dependence of crack growth rate on crack length and on other variables, such as electrochemical potential, stress intensity, and conductivity. A detailed study of crack length effects as predicted by the CEFM has never been performed, but it is postulated that crack length effects may identify the fundamental rate law for crack propagation, explain the shape of a crack front for a crack propagating through a section of constant thickness, and account for the evolution in the shape of surface cracks. This issue was the subject of the current research.

Materials and Methods

In this case, the CEFM model was calibrated for Type 304 stainless steel with an initial crack of length specified by the input data. A Type 1 stress intensity with constant, uniform tensile stress loading was assumed. Other conditions for the CEFM model are specified in "Conditions for CEFM".
First, calculations were run using the CEFM to determine the effect of initial crack length on crack growth rate at various electrochemical potential values.
Second, CEFM calculations were run on a specific time interval with the same initial crack length for the major and minor axis.
Then, manual calculations were done using the specified equations in conjunction with data gathered with the CEFM to analyze the behavior of the major and minor axes of the crack propagation.
The gathered data was then analyzed to show how the CEFM predicts crack propagation behavior as a function of initial crack length and crack shape.

References

1. D. D. MacDonald, Mirna Urquidi-MacDonald. "A coupled environment model for stress corrosion cracking in sensitized type 304 stainless steel in LWR environments" Corros. Sci., 32(1), 51-81 (1991.
2. R C. Lu, D. D. Macdonald, M. Urquidi-Macdonald and T. K. Yeh. "Theoretical Estimation of Crack Growth Rates in Type 304 Stainless Steel in BWR Coolant Environments". Corrosion, 52(10), 768-785 (1996).

Results

The first set of calculations using the CEFM shows the relationship between initial crack length and crack growth rate under the specific conditions.
The model predicts that as initial crack length increases, crack growth rate decreases. The gathered data also predicts that a higher electrochemical potential value will generally result in higher crack growth rates among all initial crack lengths. The second set of calculations using the CEFM predicts the behavior of crack propagation along the major and minor axes of the crack. While initially, the crack lengths on the major and minor axis are equal, a discrepancy quickly develops between the behaviors of crack propagation along the two different axes over a specific time interval. The data gathered shows that the crack growth rate along the minor axis decreases, resulting in an overall shorter crack length along the minor axis. The crack propagates at a constant crack growth rate along the major axis and results in a longer crack length than the minor axis. This behavior is synonymous with elliptical crack behavior. The geometry of the crack propagation therefore corresponds closely with the geometric behavior of an ellipse, with constants "a" and "b" corresponding to the behavior of the major and minor axes.

CGR vs. Crack Length for Various ECP Values

Crack Length vs. Time

Crack Growth Rate vs. Time

Discussion and Conclusions

A conclusion can be drawn to the relationship between the initial crack length and crack growth rate as predicted by the CEFM. The data shows that a shorter crack produces a faster CGR and also depends on ECP. In general, a higher electrochemical value will produce a higher crack growth rate. Conclusions can also be drawn regarding elliptical behavior of SCC in the planar surface. The data shows that L_{major} grows a lot faster (and at a constant CGR) than L_{minor} (CGR decreases over time for L_{minor}). Some preliminary calculations can be done to show this elliptical behavior along the two axes.

Acknowledgements

Poster by Dan Kramer

Another Example

Morphological Image Recognition of Deep Water Reef Corals

Jeffrey W. Kaeli — Virginia Tech

Hanumant Singh — Woods Hole Oceanographic Institution

Roy Armstrong — University of Puerto Rico

Original color image

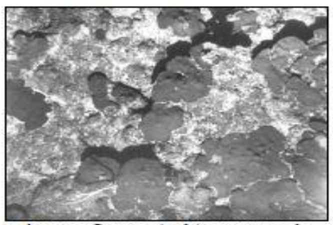
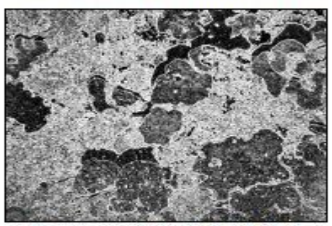


Image Converted to grayscale



Morphological Gradient (MG) intensity "texture" patterns

Introduction

Deep water coral reefs (30-100m) could shelter commercial fish stocks and provide coral larvae for recovering shallow reefs. Deep corals appear healthier than shallow corals, but depth has restricted their study. Current quantitative study methods involve scattering random points across images and visually identifying substrates.

Montastrea annularis complex is a major reef building coral representing as much as 75% of the coral cover in some areas. Its dominance and smooth texture make it an ideal candidate for image processing. The goal of this research was to develop an algorithm to segment out colonies of the *M. annularis* complex and calculate percent coverage values

Methods

Images taken by the SeaBED Autonomous Underwater Vehicle (AUV) off the Hind Bank, U.S. Virgin Islands, were analyzed with the existing random point method and the algorithm. A description of the algorithm's recognition process is shown to the left and below.

Results

Algorithm accuracy was measured using the mean of the first 15 ASF iterations, and improved exponentially with actual percent cover (Figure 1). Percent cover values generated by the algorithm (Figure 2) are competitive with those obtained using the random point method.

Discussion

Degraded coral is compensated for by misidentified substrate in the percent cover calculations. This compensation explains why error remains high while percent cover remains comparable to the random point method.

This algorithm is basic and has room for more specialized recognition strategies. Future work will involve identification of multiple species with an ultimate goal of calculating diversity and species richness.

Acknowledgments

This research was made possible by the Guest Student Program at Woods Hole Oceanographic Institution (WHOI) and the continued collaboration between WHOI and the University of Puerto Rico

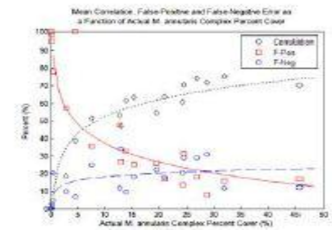
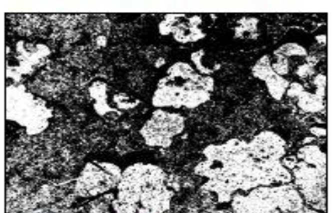
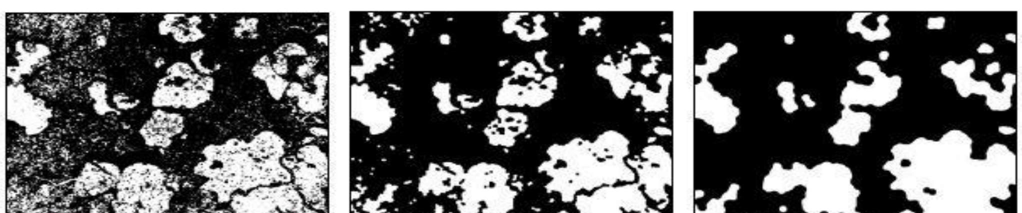


Figure 1. Mean correlation, false-positive and false-negative error

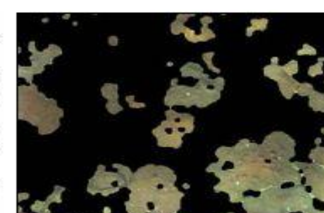
Figure 2. Algorithm mean and random point method normalized against actual percent cover



MG threshold with subtracted light and dark regions



An open-close Alternating Sequence Filter (ASF) removes salt-and-pepper noise. Each successive iteration removes particles of a larger diameter. One, five, and fifteen iterations are shown.



Original image superimposed over recognized areas

Make Time

Poster Completion Schedule

	Task
Day 1	Read and take notes on guidelines posted by the conference planners. Make a schedule.
Day 2	Read research documents. Identify key points.
Day 3	Plan your message. Pay attention to audience and purpose. Make an outline.
Day 4	Sketch a basic layout that adheres to the conference guidelines.
Day 5	Write conventional components (introduction, methods, results and discussion--IMRaD).
Day 6	Compile the references and acknowledgement sections.
Day 7	Plan graphics. Keep them simple!
Day 8	Create the graphics.
Day 9	Use a software program to build your poster.
Day 10	Print a full-sized draft. Diligently proofread and edit. Recruit readers to give feedback.
Day 11	Make suggested changes. Review carefully. Look for improvements in brevity and clarity.
Day 12	Prepare a three minute verbal explanation to accompany your poster.
Day 13	Review your poster and rehearse your explanation. Prepare a handout if needed.
Day 14	Print your final copy. Edit and proofread again. Prepare to go to the conference.

Follow the Guidelines

American Meteorological Society: A Speakers Guide to Giving Poster or Oral Presentations at AMS Conferences

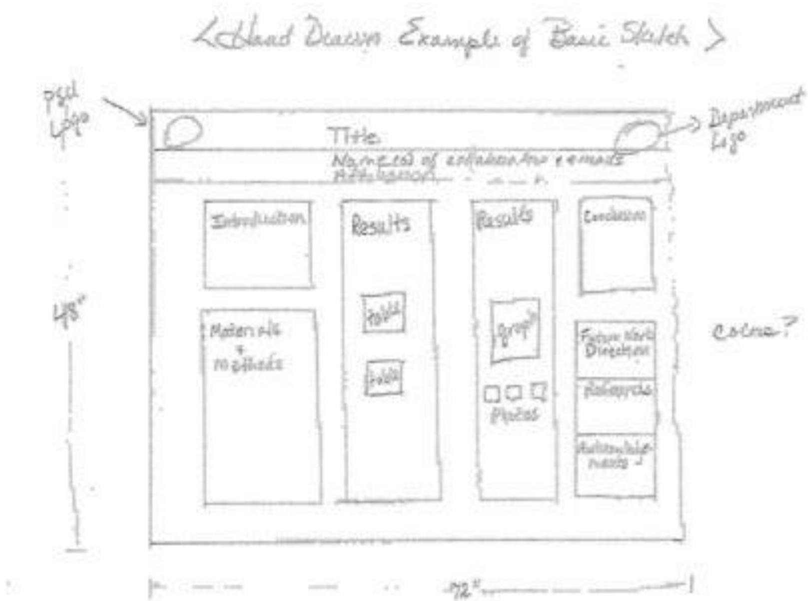
Association of Science Materials: ISTFA 2011 Guidelines for Symposium Presentations, Posters, and Tutorial Presentations

Association of American Geographers: AAG Annual Meeting, Poster Presentation

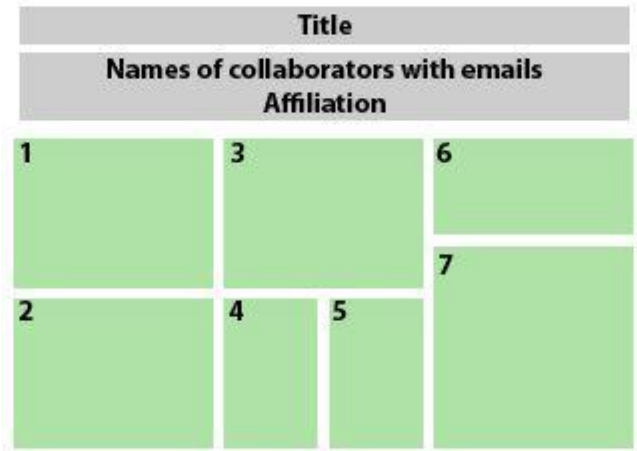
EMS Undergraduate Poster Exhibition:
http://www.ems.psu.edu/ugposterexhibit#Guidelines

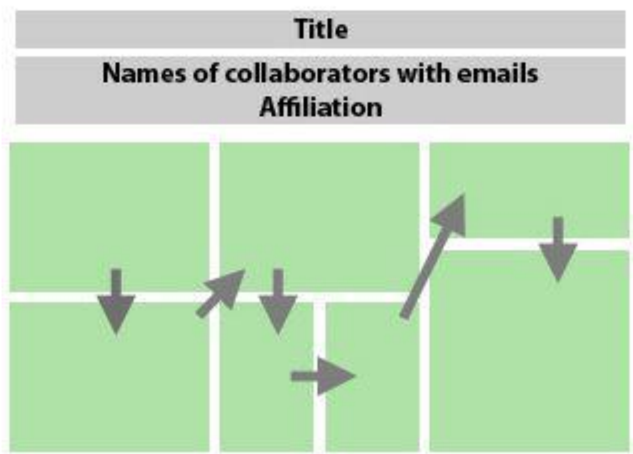
Plan Your Message

Sketch A Basic Layout



Design Your Poster





EMS Exhibition Size

Common Poster Sizes

36”X48”	48”X48”	48”X72”	48”X96”
42”X36”	42”X42”	42”X48”	42”X52”

[Free PowerPoint Templates]

Graphics

Color

TEXT

Text should readable within four feet.

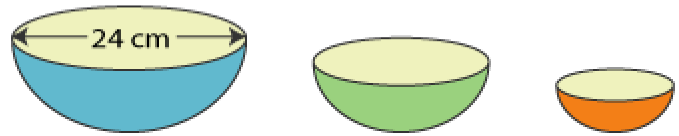


Table of text sizes

Title	85 point
Authors	56 point
Headings	36 point
Body Text	24 point
Captions	18 point

3 C's

Concise

Clear

Complete

Check out my blog for more detailed information on [specific strategies for making your writing more concise].

- Visual hierarchy is a design element when size and proportion are used for emphasis. For areas of major importance, provide more space. Giving the results section the entire middle column of your poster is a good example of using visual hierarchy to bring attention to this important section. One of the best ways to plan the arrangement is to tentatively sketch your layout and critique it. If it isn't easily seen, understood, and interesting within ten feet, consider redesigning it.
- White space (the absence of text or images) is important too. Densely packed posters are like parks with no benches; there's no place to rest. Give your reader's eyes a place to rest between segments.

Park Bench Rest

Street side sculpture garden figure at the Albuquerque Museum.

Graphic Quality

Avoid Stretching

Between 150 to 300 dpi

Title

Audience

Changes in Procyon Lotor Predation Behavior Affects Malaclemys Terrapin Nest Census

Changes in Raccoon Predation Behavior Affects Turtle Nest Census

Changes in Raccoon (Procyon Lotor) Predation Behavior Affects Turtle (Malaclemys Terrapin) Nest Census

Turtle (Malaclemys Terrapin) Nest Census Underestimated: Predation Behavior of Raccoons (Procyon Lotor) Examined by Calcium Measurements

> **Issue**: Using only the scientific names may decrease comprehension of the title and negatively affect interest in poster. Using the common names and placing the scientific names in parentheses is a good choice. The colon also helps add a secondary explanation.

Compare These Titles

Precision and Clarity

The relationship of sponge interior canal size and individual sponge volume to identity and diversity of Synalpheus inhabitants

Body size is related to host use in a diverse clade of closely related snapping shrimp species (Synalpheus)

Sponge host characteristics shape the community structure of their shrimp associates

Issue: Avoid vague terms such as *relationships, involvement, effects* or *affects*. Be precise. It may be necessary to develop a list of possible titles and select the best one for the specific audience. Notice the term, Synalpheus, is unlikely to be understood by many. Aim for expressing the poster's key message in a short phrase that your audience will find easy to understand.

Compare These Titles

How to develop sustainable tourism in Jamaica?

Developing sustainable tourism: managers' assessment of Jamaica's ten-year master plan

Issue: Use a question mark at the end of a title only if no single answer is presented, and the thrust of the poster is generating possible likely answers.

Proofread and Edit

Olny srmat poelpe can raed this. I cdnuolt blveiee taht I cluod uesdnatnrd what I was rdanieg. The phaonmneal pweor of the hmuan mnid, aoccdrnig to a rscheearch at Cmabrigde Uinervtisy, sates the olny iprmoatnt tihng is that the frist and lsat ltteer be in the rghit pclae. The rset can be a taotl mses and you can still raed it wouthit a porbelm. This is bcuseae the huamn mnid deos not raed ervey lteter by istlef, but the word as a wlohe. Amzanig, huh?

PROOFREADING TECHNIQUES:

1. Step away from your writing for at least an hour, preferably a day.
2. Read it aloud. Slowly. Listen for places you stumble. Fix them.
3. Read the last word first, then the next, and all the way through.
4. Use spell checker but don’t rely on it.
5. Have someone else proofread it.

Always proofread and edit thoroughly.

References

ADDITIONAL RESOURCES.

Websites

ePosters.net (an open access journal of scientific posters)

Which Are More Legible: Serif or Sans Serif Typefaces? (a blog about interaction design from a designer, Alex Poole)

Advice on Designing Scientific Posters (Collin Purrington, Department of Biology, Swathmore College, Pennsylvania)

Design of Scientific Posters (Engineering Department, The Pennsylvania State University)

Poster Presentations (Library of the University of Buffalo, New York)

How to Make a Great Poster (American Society of Plant Biologists, Dina Mandoli)

Posters: How to Obscure Your Message (Biology Department, The University of Miami, Kathryn Tosney)

References

Erren TC, Bourne PE (2007) Ten Simple Rules for a Good Poster Presentation. PLoS Comput Biol 3(5): e102. doi:10.1371/journal.pcbi.0030102

Tufte, E. (1983). The visual display of quantitative information. Cheshire, CT: Graphics Press.

Tufte, E. (1997). Visual explanations: Images and quantities, evidence and narrative. Cheshire, CT: Graphics Press.