

# 2005 UWEB

## Communications Workshop

---

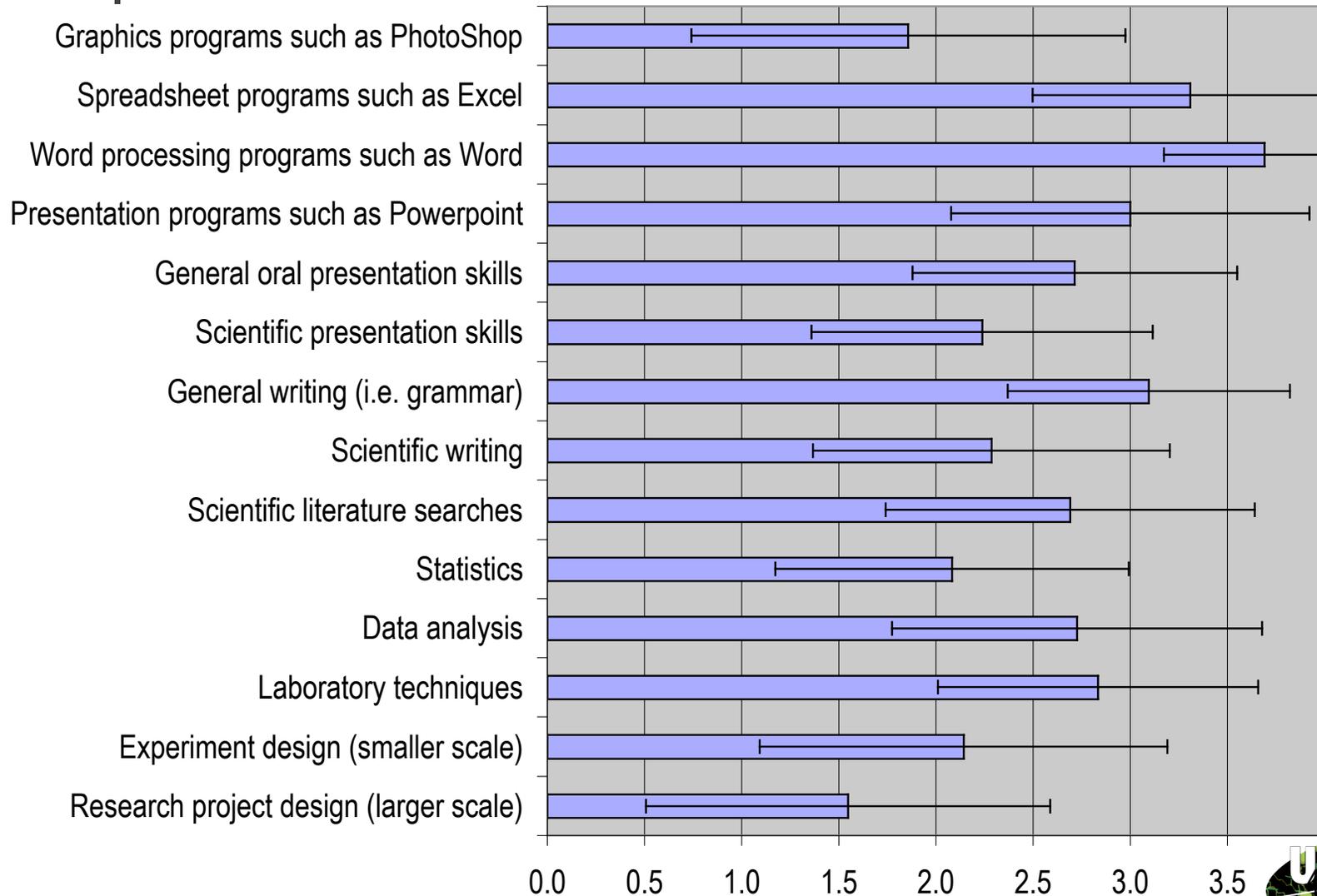
Presenting a Scientific Talk  
(and an Introduction to Scientific Research)

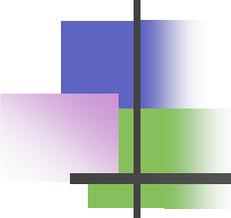
Jennifer Patterson

June 22, 2005



# Assessment Results



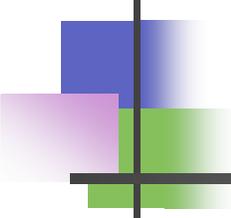


# Topics Covered

---

- Graphics programs such as Photoshop
  - July 13
- Spreadsheet programs such as Excel
  - Today and June 29
- Word processing programs such as Word
  - Not needed
- Presentation programs such as Powerpoint
  - Today and June 29
- General oral presentation skills
  - Today and June 29
- Scientific presentation skills
  - Today and June 29
- General writing
  - Not covered specifically



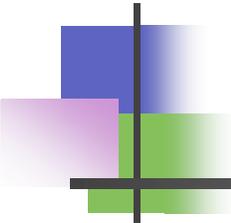


# Topics Covered

---

- Scientific writing
  - July 6 and 13
- Scientific literature searches
  - July 6
- Statistics
  - Some today, ask your mentor
- Data analysis
  - Some today, ask your mentor
- Laboratory techniques
  - Ask your mentor
- Experiment design (smaller scale)
  - Some today, ask your mentor
- Research project design (larger scale)
  - Some today, ask your mentor





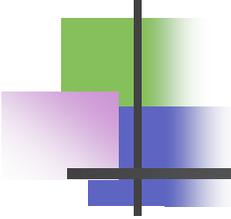
# Special Requests

---

- Movies, animations, sound in presentations (June 29)
- Making text in presentations bearable and making presentations entertaining (today and June 29)
- How to manipulate figures or pictures in Photoshop (July 13)
- Freehand and Origin (not covered)
- Etiquette for authorship of papers (July 6)
- Poster examples (see 4th floor Bagley halls)
- Coming up with project ideas/hypotheses



# Regenerative Matrices for Oriented Bone Growth in Craniofacial and Dental Repair



---

Jennifer Patterson

June 22, 2005

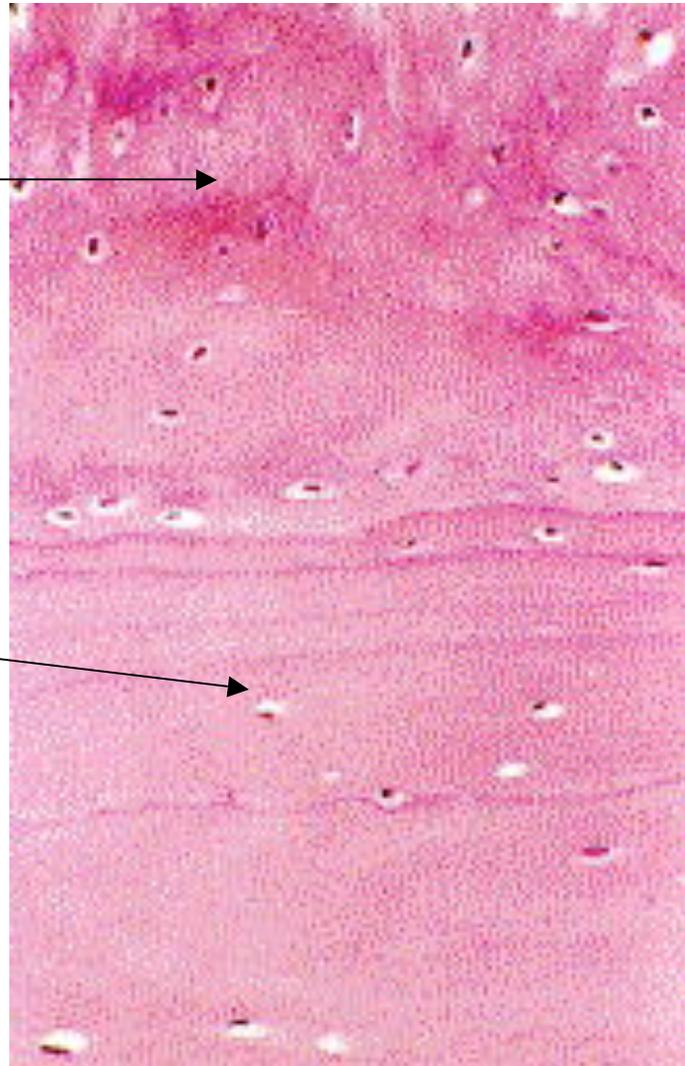


# Regenerating Good Quality Bone is Essential for Mechanical Properties

Woven

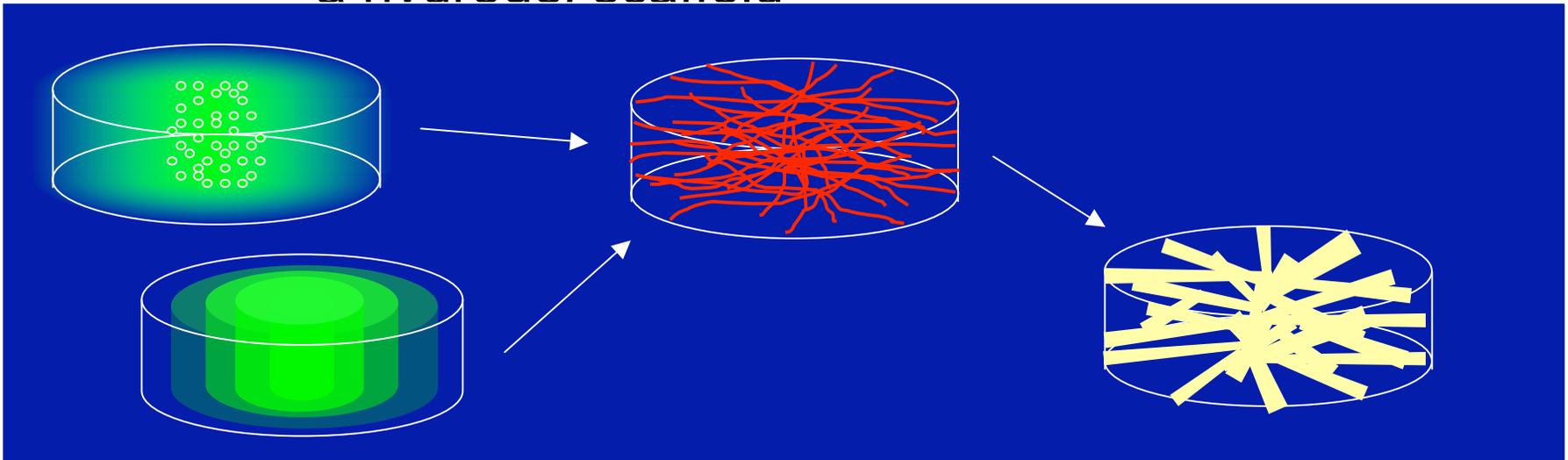


Lamellar



# Our goal is to improve the quality of the regenerated bone

- Bone orientation will follow patterns established by the developing vasculature
  - Ordered angiogenesis can be induced by controlled spatial and temporal release of vascular endothelial growth factor (VEGF) within a hydrogel scaffold



# Trabecular bone orientation will follow patterns established by the vasculature

## Specific Aim 1

Design and characterize hyaluronic acid hydrogel scaffolds for temporal control of protein release

## Specific Aim 2

Develop a rat calvarial critical size defect model for evaluation of early angiogenesis during bone regeneration in living animals

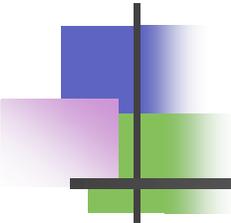
## Specific Aim 3

Test the effects of uniformly distributed VEGF on vessel orientation and mineralization in the bone defect model

## Specific Aim 4

Evaluate the effects of controlled spatial and temporal release of VEGF and/or osteoinductive factors on angiogenesis and bone growth





# Uniformly distributed VEGF in HA hydrogels may affect angiogenesis and mineralization

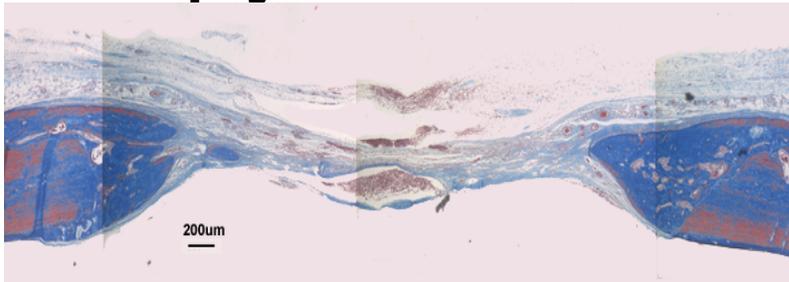
---

- Hypotheses
  - VEGF delivered from a HA hydrogel can induce angiogenic ingrowth into the scaffold
  - Bone mineralization will follow angiogenic ingrowth
- Rationale
  - VEGF enhances bone regeneration (Street *et al.*, 2002; Murphy *et al.*, 2004) but delivery from HA hydrogel scaffolds has not been tested
- Approach
  - Traditional rat calvarial critical size defect model

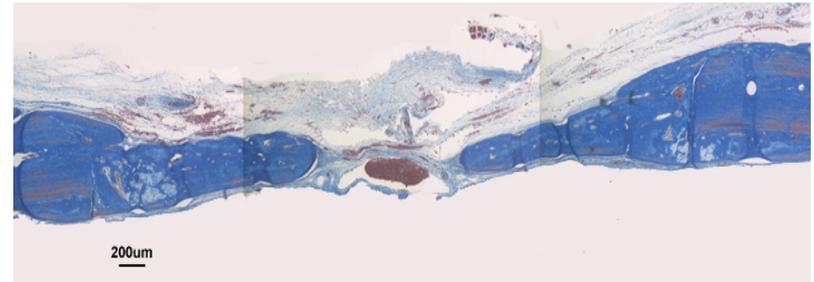


# VEGF delivery from HA hydrogel results in partial closure of defect

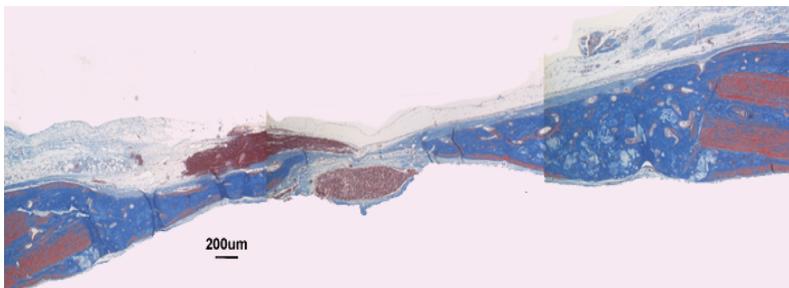
**Empty Defect**



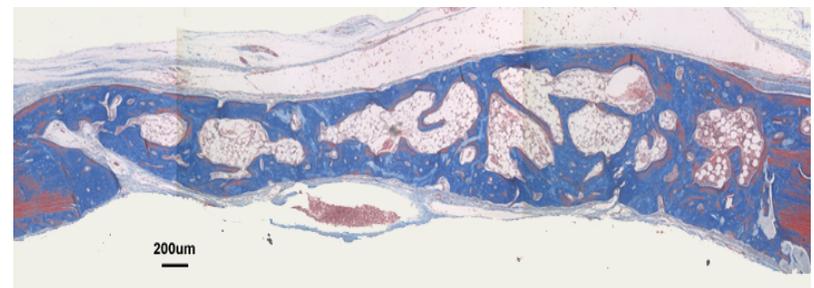
**Unloaded Hydrogel**



**VEGF Hydrogel**



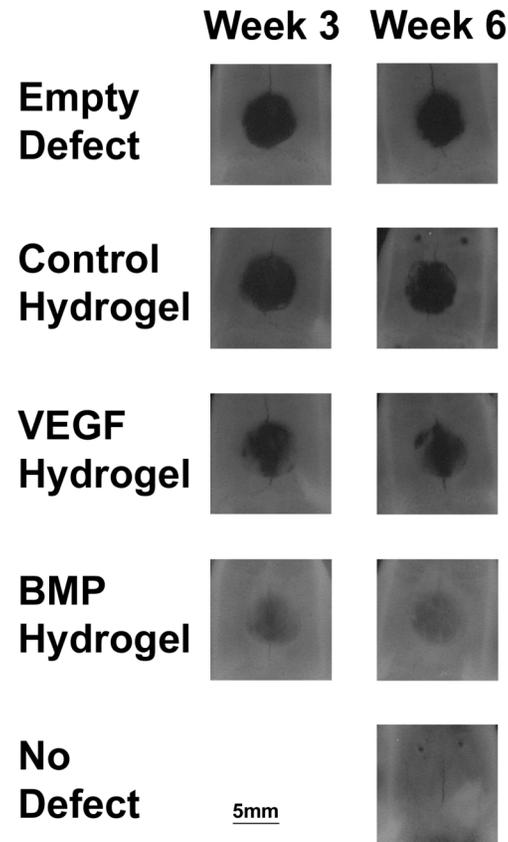
**BMP-2 Hydrogel**



- Decalcified sections stained with Masson's trichrome



# VEGF delivery from HA hydrogel results in some mineralization in defect model

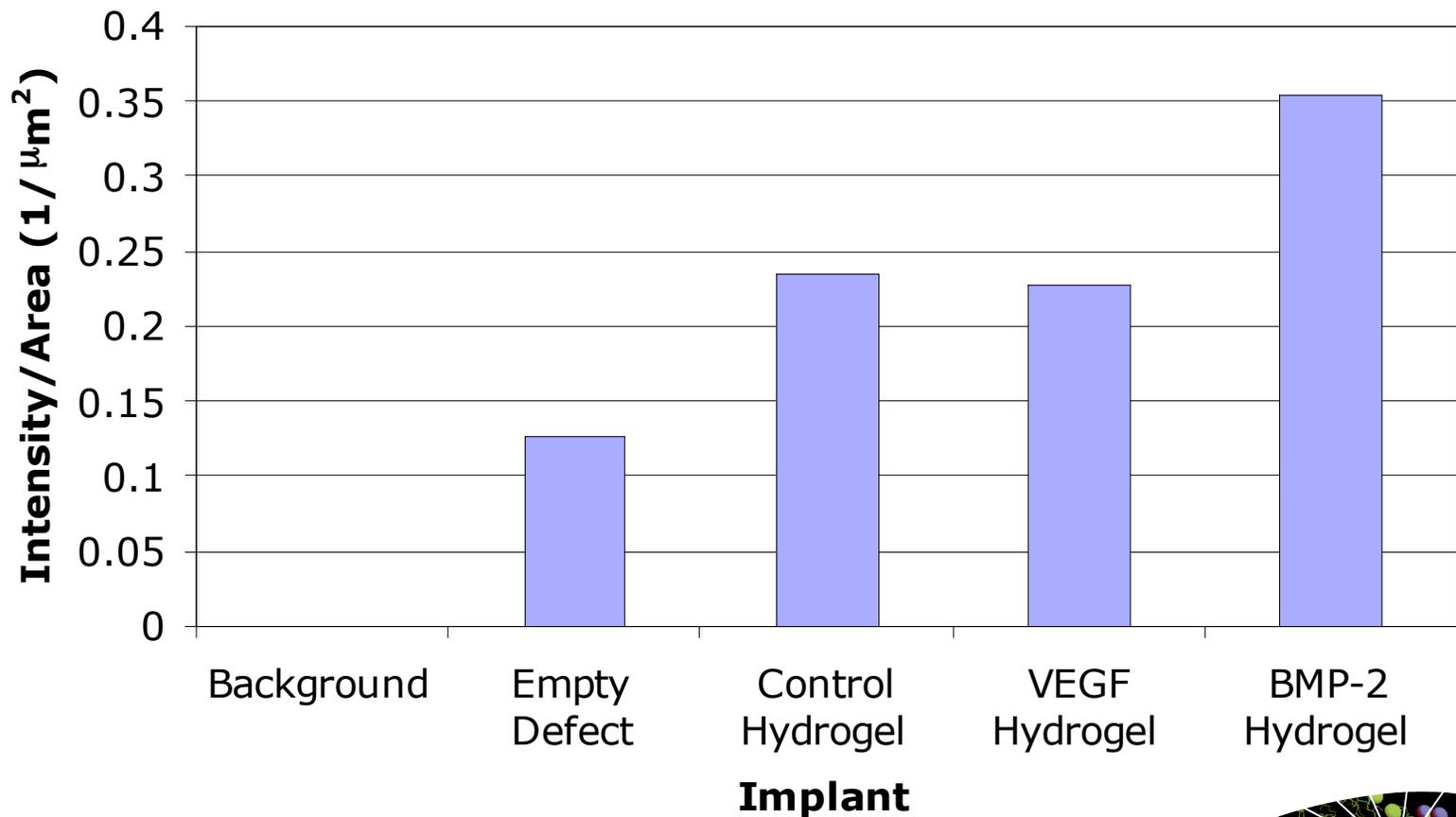


- Extent of mineralization measured by X-ray



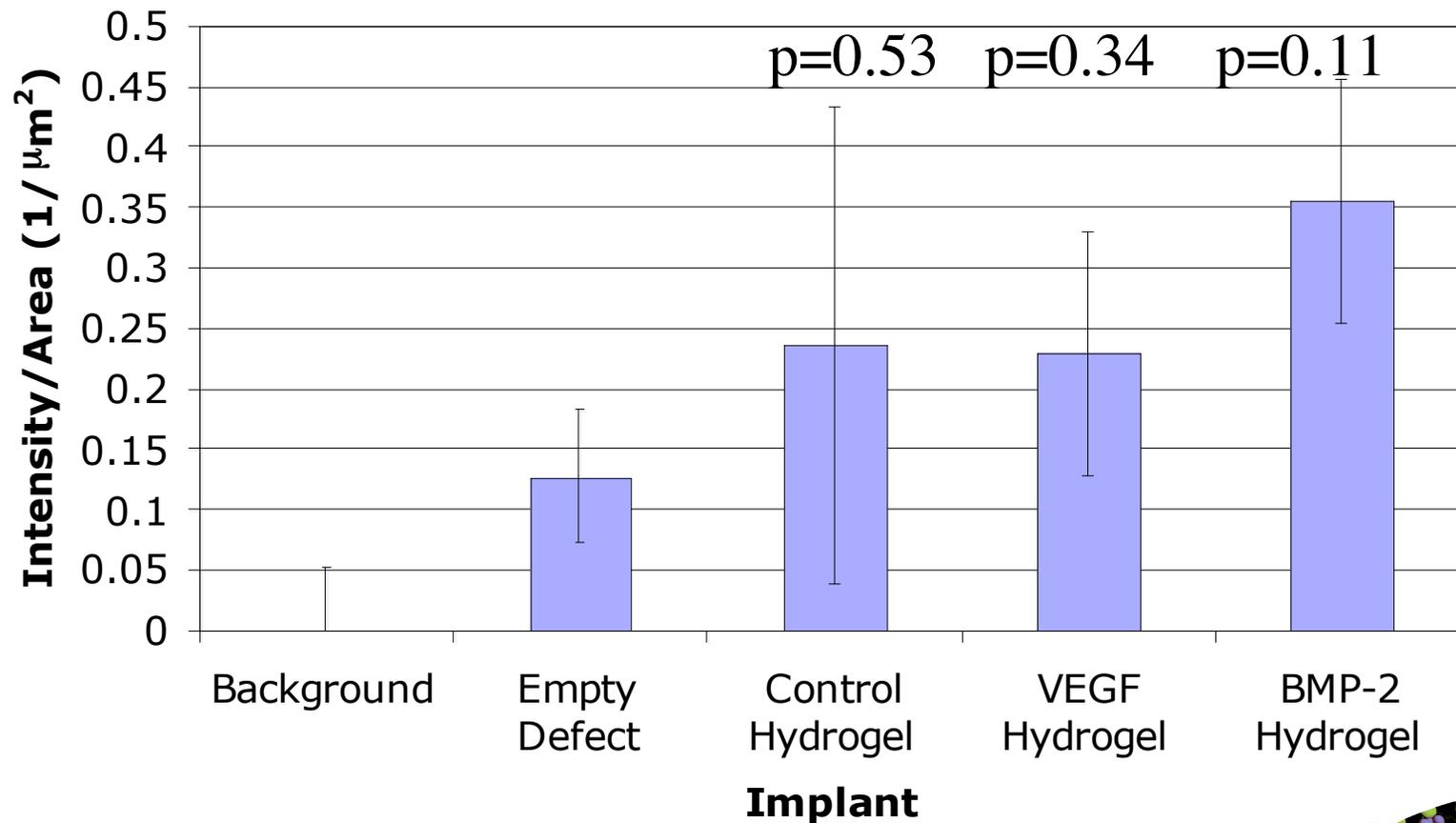
# Extent of mineralization increases with treatment of defect with scaffold

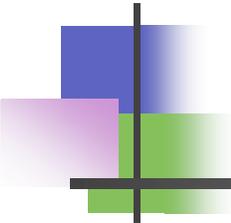
**Extent of Mineralization Measured by X-Ray**



However, this effect is not statistically significant

**Extent of Mineralization Measured by X-Ray**



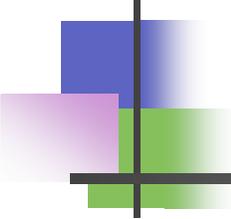


# How to improve statistical significance

---

- Increase the sample size
- Perform a power analysis
  - Uses estimates of error and difference of means between treatment groups to determine sample size needed
- For a power = 0.8
  - Need  $n=4$  for BMP-2 hydrogel
  - Need  $n=17$  for VEGF hydrogel
  - Need  $n=65$  for control hydrogel





# Some statistics references

---

- Aaron DK and Hays VW. “How many pigs? Statistical power considerations in swine nutrition experiments” Journal of Animal Science. 2004. 82 (E. Suppl.): E245-E254.
- <http://www.stat.ucla.edu>
- <http://www.graphpad.com/quickcalcs/index.cfm>
- <http://www.statistics.com/content/javastat.html>



# The Oral Presentation

- First chance to associate name with face
- One shot to communicate ideas effectively



“The skill of presenting an engaging and well-structured seminar often determines our professional reputation and future success...”

- Robert R. H. Anholt, Dazzle 'Em With Style

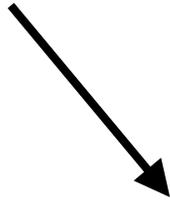


# Significance

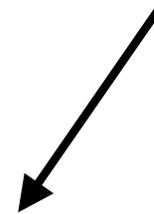
- People remember 10% of what they hear
- Short-term memory retains 5-7 ideas



**Visual learners**



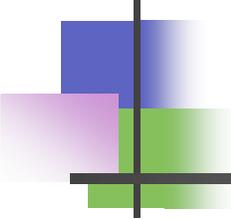
**Auditory learners**



**Appeal to both and get your point across**

*\*\*Adapted from Buddy Ratner's "Effective communication: the art of oral presentation"*





# Preparation

---

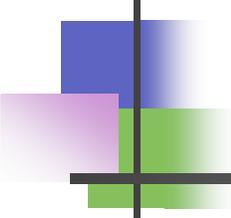
- Know what you are getting into
  - Audience, time limits, focus of talk
- Create good slides
  - Easier said than done
- Practice
  - Alone and with an audience
- Revise, revise, revise
- Anticipate questions
  - The sign of a good presentation



# Know Your Audience

- What you want
  - Understands your subject
  - Eager to hear your presentation
  - Courteous and respectful
  - Wide awake
- What you get
  - Does not know you or your subject
  - Planning where to be next
  - Focused on their own talk
  - Forgot to turn off cell phone or beeper
  - Sleepy, inattentive





# Pleasing Your Audience

---

- Create a favorable impression
  - Look and act professional
  - Show enthusiasm for topic (it's OK to smile)
  - Stay within time limit
  - Prepare and exciting presentation
- How to offend an audience
  - Inappropriate behavior (dress, manner of speech)
  - Arrogance or over-confidence
  - Poor delivery of presentation
  - Running over time

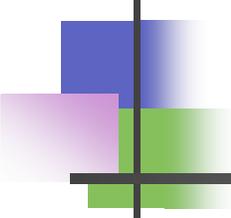


# Keeping On Time



- Know the time
  - Bring a watch or timer if there is no clock in room
- If you start running short on time
  - Avoid by practicing final talk several times
  - Speed up talking
  - Only present most important findings and skip over details
  - Skip slides if necessary
- But do not panic
  - Do not skip everything and go right to the conclusion



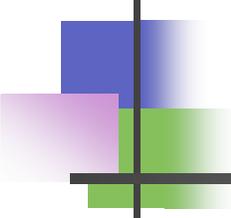


# Content and Organization

---

- Introduction (15-30%)
  - Title slide (include title, authors, organization)
  - “Outline” slide only for long presentations
  - Background (previous work, significance)
  - Objectives (hypothesis and specific aims)
- Main Body (50-75%)
  - Materials and methods
    - Figures or flow charts
  - Results and discussion
- Conclusions (10-20%)
  - Future work and implications
  - Acknowledgments
    - Funding, people who contributed to work





# Repetition Is A Good Thing

---

- Tell them what you're going to tell them

## Introduction

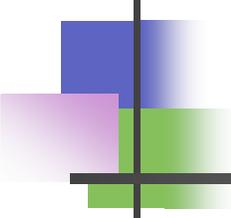
- Tell them

## Main Body

- Tell them what you've told them

## Conclusions



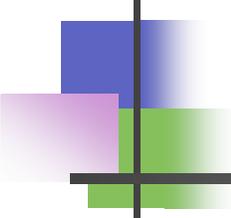


# Introduction

---

- Get the attention of the audience
  - Motivation - 2 minutes to capture attention
  - Your motivation needs to become the audience's motivation to pay attention
- Start general and narrow to focus
- Present background material
- State hypothesis and objective of study



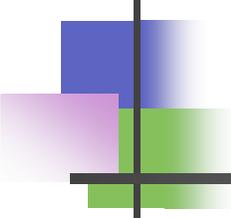


# Main Body

---

- Materials and methods
  - Clearly explain the experimental procedures
  - Do not give every little detail
  - A picture is worth a thousand words
- Results
  - Present and explain the data
  - Highlight important findings



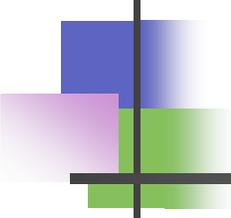


# Conclusions

---

- Summarize work
- Relate main findings to hypothesis and overall work in the field
- List future directions of work
  - Specific next steps
  - Implications of results
- Acknowledgements





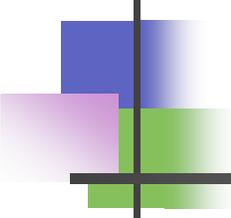
# Creating Good Slides

---

- Comprehend in less than 1 minute
- Specific purpose or conclusion for each slide
- Contains all essential information
- Visually stimulating
  - Graphics and images in addition to text
  - Good use of space
- Minimize text on slide (bullets)
  - Prevents reading of slide

*\*\*Adapted from Allan Hoffman's "Anatomy of a technical presentation"*



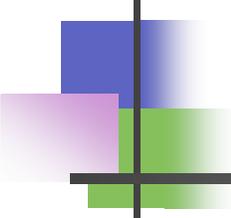


# Slide Format - Templates

---

- Unifying image for presentation
  - Too much can be distracting
  - Typically small graphic or subtle background pattern
- In Powerpoint: Format → Slide Design
  - Select from pre-loaded templates
- Can modify or create your own
  - View → Slide Master
- Include organization or company logo
  - Can be a starting point for color scheme



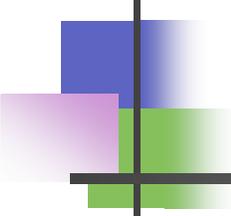


# Slide Format - Color Scheme

---

- Also provides unifying and professional image
  - In Powerpoint: Format → Slide Color Scheme
    - Sets text, background, and accent colors for all slides
- Contrast shows up best
  - Dark on light OR
- Consider room lighting **light on dark**
  - Dark on light better for well-lit rooms
- Consider material you will be presenting
  - Fluorescence micrographs look better on dark background



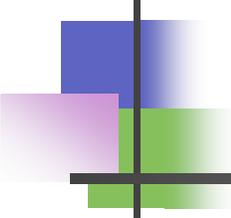


# Slide Format - Font

---

- Use one font throughout presentation
  - Could use second font as highlight
  - Common choices: Arial, Times, Helvetica
- Choose font size large enough to see in back of room
  - 44 point, 36 point, 28 point, 24 point, 20 point, 18 point, 16 point, 14 point, 12 point, 10 point, 8 point
  - Don't forget about text in figures
- Highlight with **bold**, underline, *italics*, shadow, or color
  - Latin phrases in italics (*in vitro*, *et al.*)



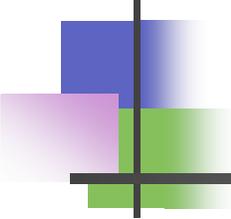


# Text *Versus* Images

---

- Text - MINIMIZE USE
  - Use bullet points instead of sentences
  - Make slide titles useful and informative
    - Active titles
  - Consider graphs instead of large tables
- Images - MAXIMIZE USE
  - Images or graphs of data
  - Schematics, flow charts or cartoons
  - Animation or movies
    - Don't overuse
    - Practice first!





# Formatting Figures

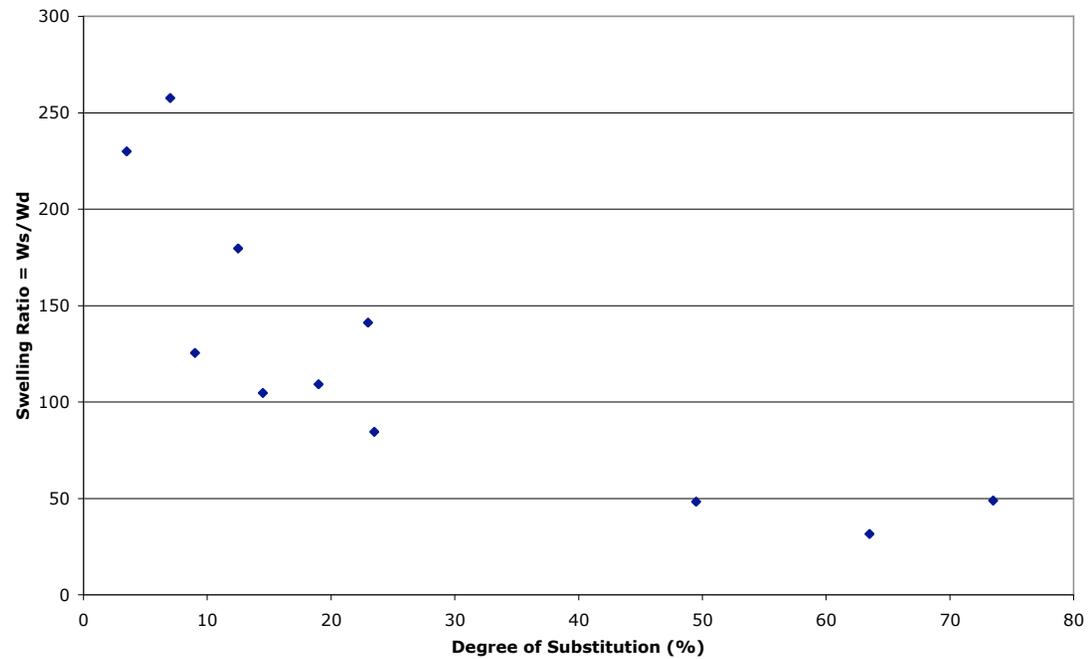
---

- Graphs
  - Check font size for all labels
  - Don't include too much data on one graph
  - Include error bars where appropriate
    - Be careful with trendlines
- Images
  - Include a scale bar and labels
  - Avoid enlarging picture too much
    - Pixelation or fuzziness
  - Reduce resolution of picture in Photoshop to avoid large file sizes



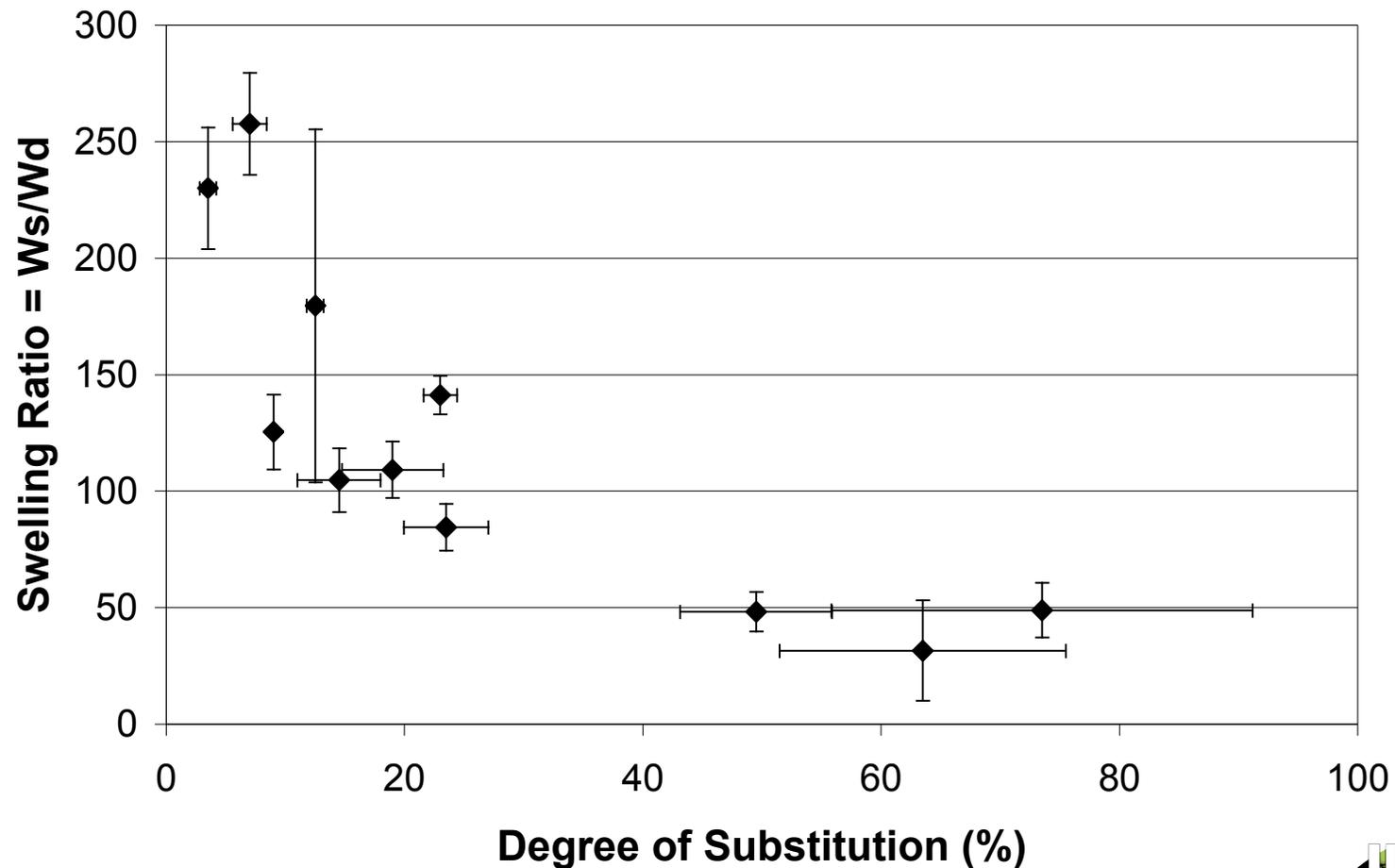
# A Bad Graph

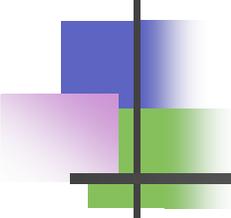
Hydrogel Swelling in Water After 195 Hours



# A Better Graph

## Hydrogel Swelling in Water after 195 Hours



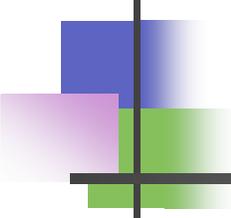


# Working with Excel

---

- Choose correct type of plot
  - Scatterplot *versus* bar graph
- Present data as averages with error bars (standard deviation)
  - =AVERAGE(A1:A5)
  - =STDEV(A1:A5)
- Plot using chart wizard
  - Format axes to change font sizes
  - Format data series to add error bars
    - Can be fixed percentage or custom
  - Chart → Add trendline
    - Select proper regression type - not always linear
- Insert as picture (paste special)



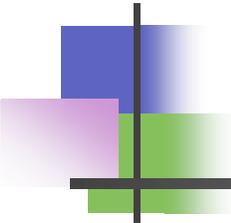


# Citations

---

- Cite ALL material and data from others
- Minimum
  - Johnson N *et al.* Science, 2001.
- More complete
  - Johnson N *et al.* Science, 248:134-138, 2001.





# Revisions

---

- Focus on content
  - Eliminate extraneous slides
- Practice
  - Friends or colleagues who will give honest criticism
- Spend time on background and color choices at beginning of process
  - Prevents having to reformat slides
- Proofread!



# Delivery

- Posture - stand up straight; don't fidget, sway, bounce
- Gestures - use, but don't overuse (i.e. laser pointer)
- Voice - loud enough, face audience, steady pace
- Eye contact - look at audience members, don't focus on one spot
- AV - know the equipment; get there early and check
- Confidence - anxious but excited; don't apologize

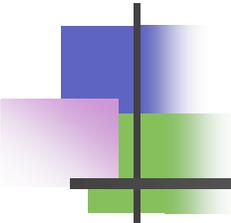


Audience wants you to  
be entertaining &  
informative

RELAX, RELAX, RELAX, RELAX, RELAX

*\*\*Adapted from Buddy Ratner's "Effective communication: the art of oral presentation"*





# Handling Questions

---

- Leave time for questions
- Always repeat the question
  - Also allows others to hear the question
- For clarification questions, answer directly and simply
- For hypothetical or significance questions, don't guess or mislead
- Acknowledge the validity of the question
  - “That is a very good question”
  - Gives you a few seconds to compose an answer

