



How To Make An Effective Poster

Slides from Matthew Stuckey, UC Davis

Some parts edited by Bilal Gökce



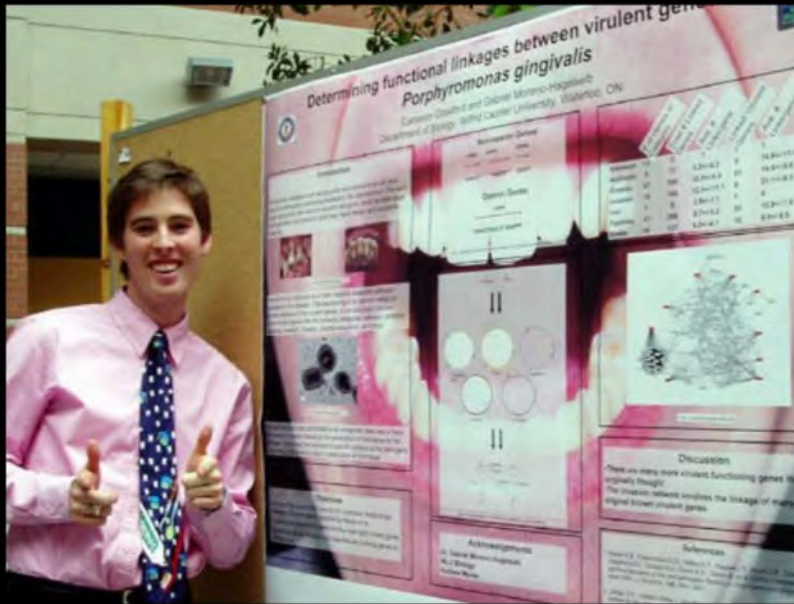
“The more strikingly visual your presentation is, the more people will remember it. And more importantly, they will remember you.”

— Paul Arden

What is the purpose of an academic poster?

"...to display information in a clear, concise manner, while generating interest to engage in a discussion"

NO



≠



YES



=



The implications, please...

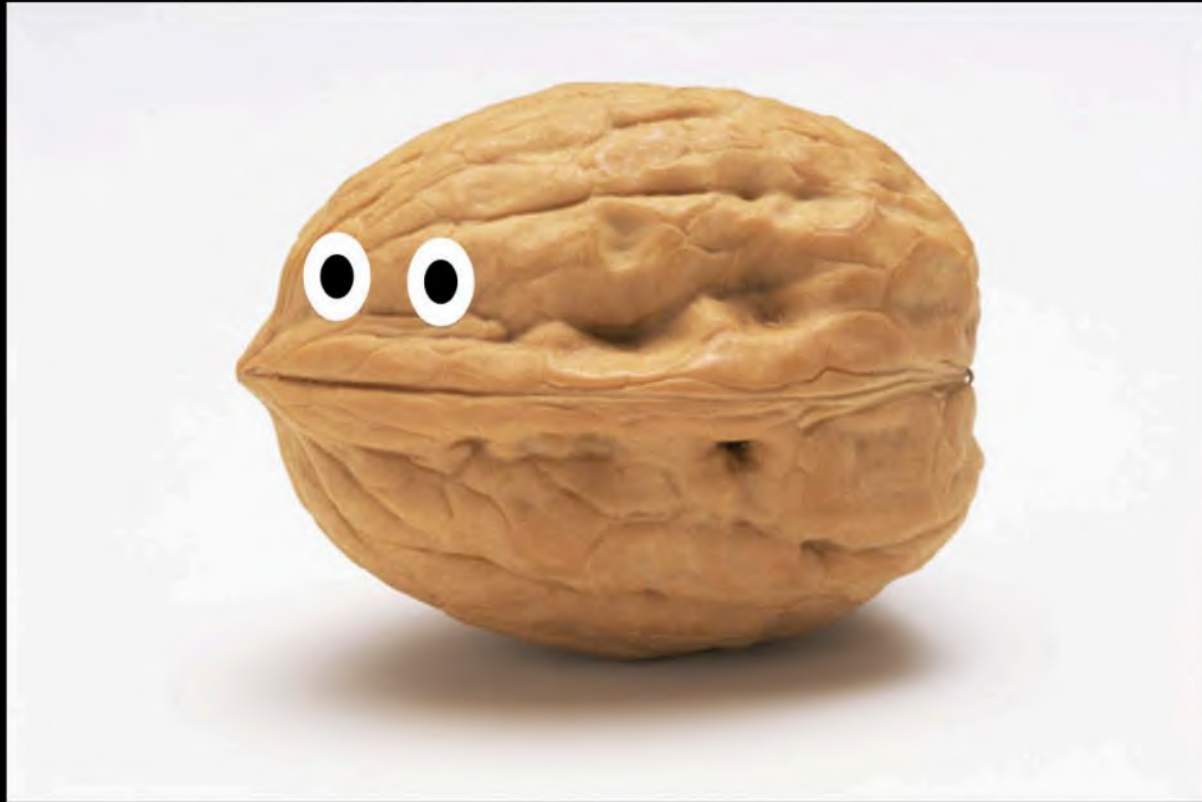
HERETICAL STATEMENT #1:

conference posters don't really have that much to do with the research.

HERETICAL STATEMENT #2:

in reality, conference posters are pretty much all about networking and shameless self-promotion.

IN A NUTSHELL:



**YOUR POSTER MUST
GRAB EYEBALLS.**

What is an Academic Poster?

- A form of Academic Expression
- Summary of Research (5 – 10 minutes)
- Visually augmented discussion/interaction
- At conferences viewers come to you (or you can invite)
 - People search published abstracts
 - Posters may be grouped by field & folks may wander
- New Information
- Characteristic Fields
- Appearance/Content varies by Field or Lab



Why are Academic Posters Important?

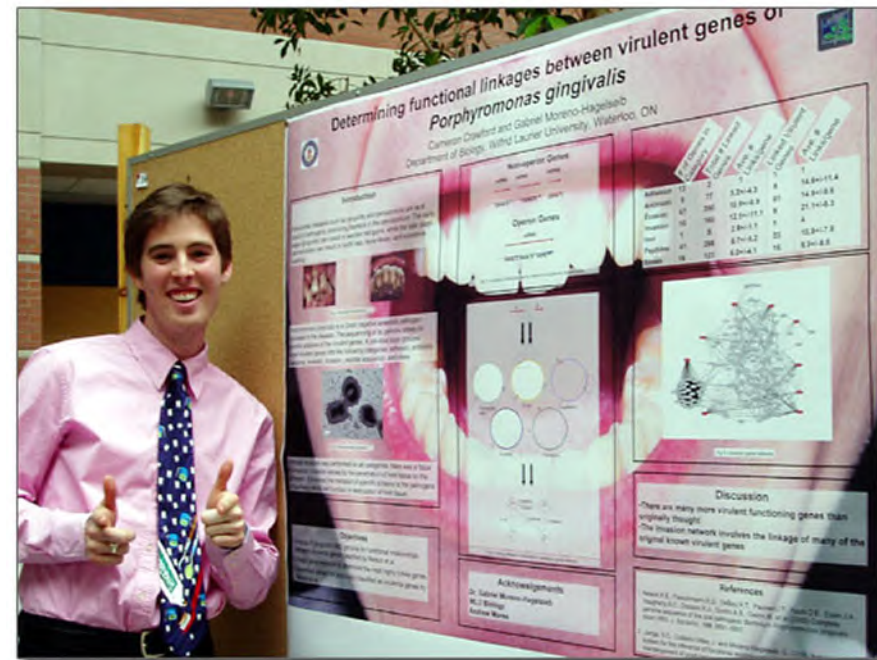
- Represents you and your group's research at:
 - Conferences
 - Symposia
 - Hallways
 - Informational Days
- Demonstrate expertise
- Demonstrate attention to detail
- Practice public speaking
- Learn about most current results in field
- Deepens understanding of topic
- Opportunity for teaching and learning
- Share ideas
- Create collaborations



Preparing Your Poster

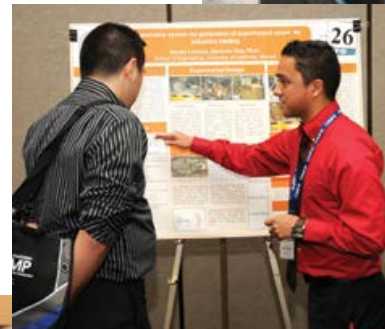
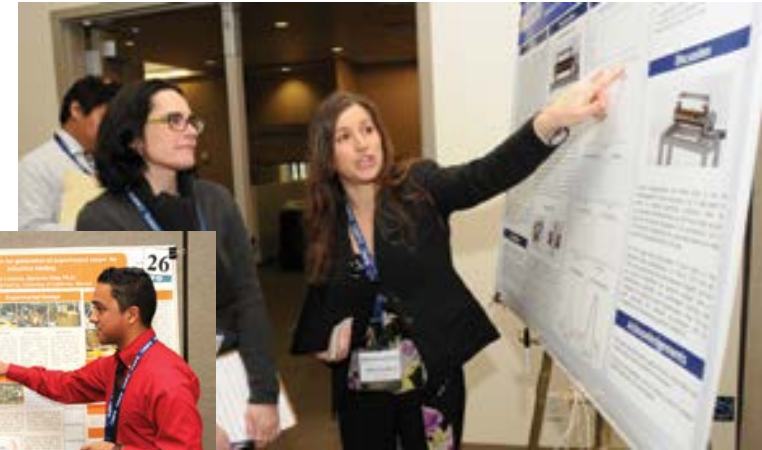
Keep in Mind:

- Characteristic sections with expected information
- Consult rules of conference/rubrics
- Work in collaboration w/ research sponsor
- Decide on experiments that will be presented
- Create a storyboard/plan
- Visually appealing
- Primarily image driven but stand alone
- Simply and tightly written
- Know what to say for each figure
- Transitions between sections
- Practice for your audience
- KNOW all details of project
- Master questions



Your Audience will be??

- Researchers in your field will read even if bad
- Researchers in related fields easily persuaded to view
- Previously uninterested passers by can be attracted by a good poster
- ***You want to attract these people!***



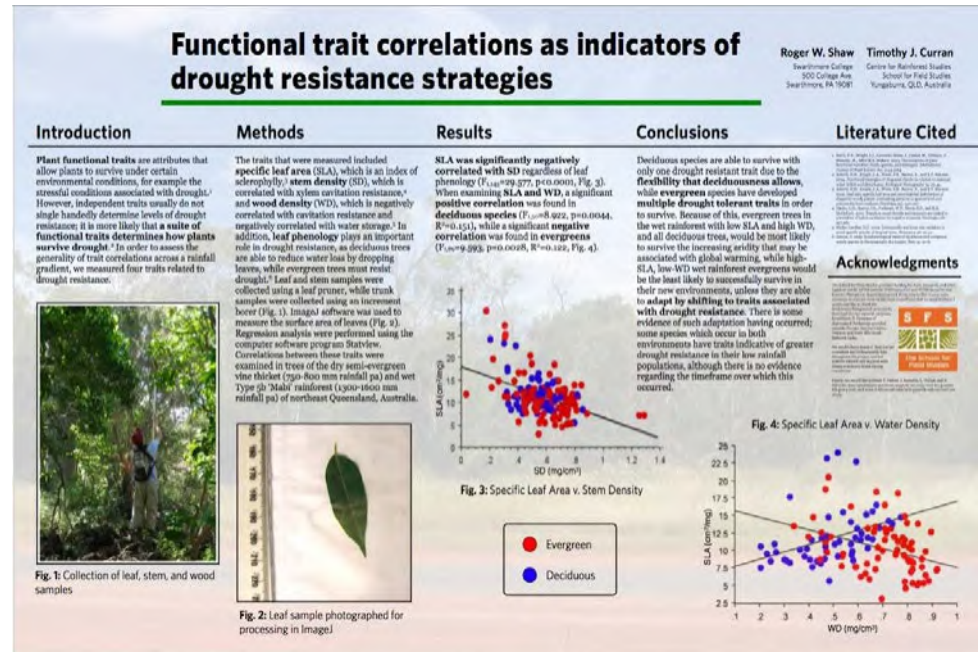
Main Elements of a Poster

- Title (same as submitted abstract)
- Name and Campus
- Core Technical Content
 - Abstract
 - Introduction
 - Results
 - Discussion
 - Literature cites/Resources
 - Acknowledgements
- Visuals
- Font should be legible fonts like:
 - Times New Roman
 - Arial
 - Garamond
 - Berkeley UC Davis Medium
 - Do not use illegible fonts like:
 - *Brush Script*
 - Use the same font type throughout your poster
 - No smaller than 16 pt. font

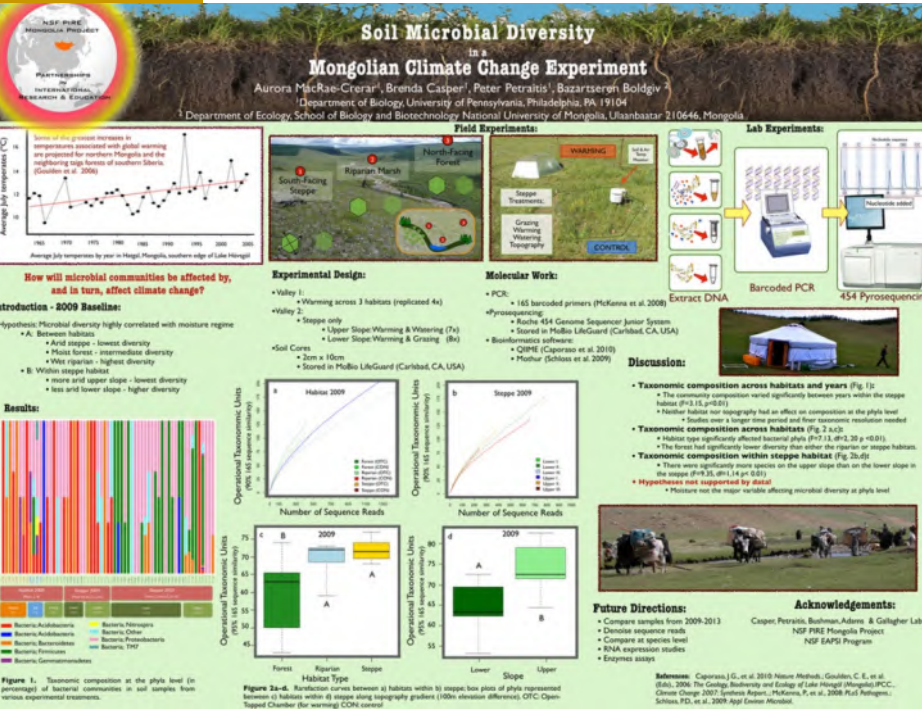


Poster Appearance

- Make rough plan of your poster
 - Will have “standard” headings
 - Poster provides visual aids as you talk
 - Picture worth 1K words
 - Carry information with colorful images and figures
 - Estimate space that will be needed –
 - How many experiments reported
 - How many figures needed?
 - What types of figures?
 - How much text to explain
 - Space for text
- Poster must be “stand alone” (understandable in halls, unstaffed)
 - Has to have words
 - Word amount varies with field
 - Balance your text and images



Poster's Appearance



Which do you prefer?

A Randomized, Multi-Center, Prospective Analysis of Diabetic Foot Ulcers treated with TheraGauze alone or TheraGauze+Becaplermin

Adam Landsman, DPM, PhD, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA; Patrick Agnew, DPM, Coastal Podiatry, VA Beach, VA; Robert Joseph, DPM, PhD, Dayton, OH; Lawrence Parish, MD, Thomas Jefferson University, Philadelphia, PA; Robert Galiano, MD, Northwestern University, Chicago, IL



ABSTRACT
This study represents the first randomized, multicenter, prospective study testing a moisture regulating dressing for the treatment of diabetic foot ulcers, in conjunction with TheraGauze's topical monomeric growth factor (MGF) (1).

INTRODUCTION
Most wounds heal with active metabolism from a combination of local wound care for stain status. However, it is also clear that moisture without precise regulation can lead to wounds which become either macerated or desiccated, and this can greatly diminish the capacity for healing.

CONCLUSIONS
In this study, we demonstrated that precise moisture regulation results in an increase in the percentage of wounds closed, and increases the rate of wound healing.

REFERENCES
1. Stankovic, D., et al. J Wound Care 2009; 20(7): 48-52.
2. Donaghy, V.M., et al. Adv Wound Care 1998; 9(10): 11-14.
3. Vivas, A., et al. Diabetes Care 2001; 24(2): 208-212.
4. Warriner, T.H., et al. Diabetes Care 1988; 11(2): 82-85.
5. Stankovic, D., et al. J Am Coll Surg 2009; 209(2): 181-184.
6. Warriner, T.H., et al. Wound Rep Rep 1999; 9(9): 569-576.
7. Stankovic, D., et al. Wound Repair Regen 1999; 7(5): 511-515.



what is a visual hierarchy?

“The visual organization of elements within a design format to establish focal points based on their importance to the message to be communicated”

“The organization and prioritization of content as a means to communicate a message”

“Using color, contrast, texture, shape, position, orientation, and size to organize elements in a way that gives users a sense of visual importance”

why use a visual hierarchy?

- humans are primarily visual creatures
- we tend to focus on **differences**, not similarities, when making comparisons
- this is a key consideration for designing an effective poster

POSTER = COMMUNICATION,
and

DESIGN = COMMUNICATION,

SO ...

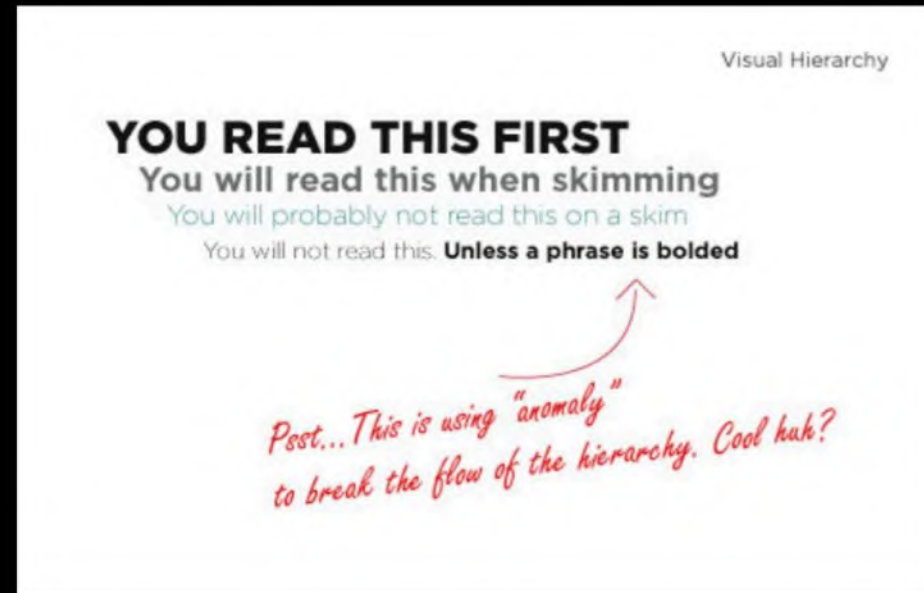
GOOD DESIGN = EFFECTIVE POSTER

(assuming that your data isn't crap – but there are ways to get around that as well)

elements of a visual hierarchy

a visual hierarchy is constructed using some combination of the fundamental principles of graphic design

- negative/positive space
- contrast
- repetition
- proximity
- color
- alignment
- typography (not really a principle)



negative/positive space

- the balance between negative (background) and positive (foreground) space in a composition is very important
 - too much negative space = incomplete or disassociated appearance
 - too little negative space = busy, cluttered, and difficult to read

cramming too much information into too small of a space is far and away the number-one mistake in academic poster designs

types of contrast



color

- color theory is an extremely complicated topic that could take up an entire class on its own
- for our purposes we will focus on two aspects:
 - color as an emotional tool
 - color as an organizational tool

KEY																	
Alkali metals										Other metals							
Alkali earth metals										Semimetals				Non metals			
Transition metals										Rare earths				Noble gases			
Radioactive rare earths										Hydrogen							

1 H Hydrogen 1																	2 He Helium 2	
3 Li Lithium 3	4 Be Beryllium 4																	10 Ne Neon 10
11 Na Sodium 11	12 Mg Magnesium 12																	18 Ar Argon 18
19 K Potassium 19	20 Ca Calcium 20	21 Sc Scandium 21	22 Ti Titanium 22	23 V Vanadium 23	24 Cr Chromium 24	25 Mn Manganese 25	26 Fe Iron 26	27 Co Cobalt 27	28 Ni Nickel 28	29 Cu Copper 29	30 Zn Zinc 30	31 Ga Gallium 31	32 Ge Germanium 32	33 As Arsenic 33	34 Se Selenium 34	35 Br Bromine 35	36 Kr Krypton 36	
37 Rb Rubidium 37	38 Sr Strontium 38	39 Y Yttrium 39	40 Zr Zirconium 40	41 Nb Niobium 41	42 Mo Molybdenum 42	43 Tc Technetium 43	44 Ru Ruthenium 44	45 Rh Rhodium 45	46 Pd Palladium 46	47 Ag Silver 47	48 Cd Cadmium 48	49 In Indium 49	50 Sn Tin 50	51 Sb Antimony 51	52 Te Tellurium 52	53 I Iodine 53	54 Xe Xenon 54	
55 Cs Cesium 55	56 Ba Barium 56	57-71 La Lanthanum 57	72 Hf Hafnium 72	73 Ta Tantalum 73	74 W Tungsten 74	75 Re Rhenium 75	76 Os Osmium 76	77 Ir Iridium 77	78 Pt Platinum 78	79 Au Gold 79	80 Hg Mercury 80	81 Tl Thallium 81	82 Pb Lead 82	83 Bi Bismuth 83	84 Po Polonium 84	85 At Astatine 85	86 Rn Radon 86	
87 Fr Francium 87	88 Ra Radium 88	89-103 Ac Actinium 89	104 Rf Rutherfordium 104	105 Db Dubnium 105	106 Sg Seaborgium 106	107 Bh Bohrium 107	108 Hs Hassium 108	109 Mt Meitnerium 109										
89 La Lanthanum 89	90 Ce Cerium 90	91 Pr Praseodymium 91	92 Nd Neodymium 92	93 Pm Promethium 93	94 Sm Samarium 94	95 Eu Europium 95	96 Gd Gadolinium 96	97 Tb Terbium 97	98 Dy Dysprosium 98	99 Ho Holmium 99	100 Er Erbium 100	101 Tm Thulium 101	102 Yb Ytterbium 102	103 Lu Lutetium 103				
97 Ac Actinium 97	98 Th Thorium 98	99 Pa Protactinium 99	100 U Uranium 100	101 Np Neptunium 101	102 Pu Plutonium 102	103 Am Americium 103	104 Cm Curium 104	105 Bk Berkelium 105	106 Cf Californium 106	107 Es Einsteinium 107	108 Fm Fermium 108	109 Md Mendelevium 109	110 No Nobelium 110	111 Lr Lawrencium 111				



color temperature – warm or cool?



color temperature – warm or cool?



color temperature

warm vs. cool colors

- warm
 - hues from red through yellow, including browns and tans
 - seem to advance or appear more active; often evoke feelings of happiness, optimism and energy, but can be visually overwhelming
- cool
 - cool = blue-green through blue-violet, including most grays
 - appear to recede into the background; usually calming and soothing, but can also express sadness

color as an organizational tool



Inorganic Biochemistry of Iron Proteins

Duke University – Department of Chemistry – Durham, NC



Purpose:
To study iron protein biochemistry from the perspective of the iron Protein = Ligand

The Iron Paradox
Iron is needed for nearly every living cell
Iron is toxic and can produce reactive oxygen species & must be controlled

Iron Abundance in Humans
40-50 mg/day in humans
75% in Red Blood Cells (Hemoglobin) & 1% in Transferrin
Turnover of transferrin iron is ~30 mg/24 hours with 80% of this Fe being transported to the bone marrow for hemoglobin synthesis
Bacteria can also target Tf as a source of iron

Proteins act as the 1st & 2nd coordination shell of iron and can modulate the kinetics and thermodynamics of reaction.

Techniques:

Spectroelectrochemistry
UV-Visible Spectroscopy
Fluorescence Spectroscopy
Difference Spectroscopy
Stopped-Flow Kinetics
SUPREX

TRANSFERRIN
A mechanistic study of the iron release by receptor-bound transferrin using spectroelectrochemistry

FERRIC BINDING PROTEIN
Role of a synergistic anion on modulating iron uptake in a bacterial transferrin by pathogenic bacteria: A study in kinetics and thermodynamics

HEMOGLOBIN
Effects of subunit cross-linking on hemoglobin oxidation states determined by spectroelectrochemistry

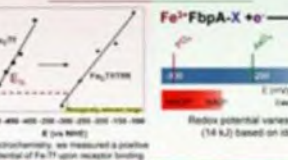
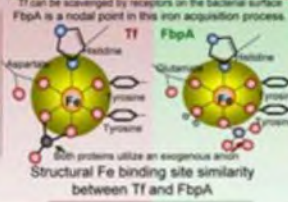
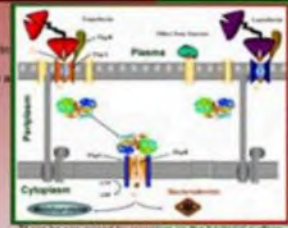


Iron loaded Tf binds to the further receptor and is taken into the cell by endocytosis. Tf releases iron inside in the endosome where the conditions are acidic (pH ~ 5-6). However, the chemical mechanism is unclear. The reduction potential of Fe(II) in the plasma (pH 7.4) and in the endosome (pH 5.5) is too low for biological reducing agents.



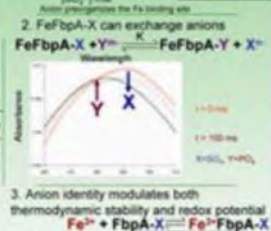
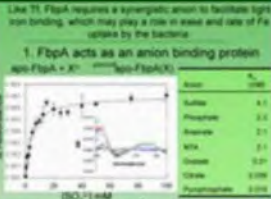
The transferrin receptor is capable of shifting the reduction potential into the range accessible by biological reducing agents, allowing for a viable mechanism of Fe release. Transferrin not only supplies iron to mammalian cells, but has been identified as a target for pathogens to mechanistically steal iron from their host.

Wheeler, Zak, Aasen and Curtiss (1998) Inorg Chem 37, 954.
Dhungana, Talley, Anderson, Vaughan, Aasen, Metzner and Curtiss (2002) PNAS 100, 3659-64.
Dhungana, Talley, Zak, Levin, Curtiss and Aasen (2004) Biochem 43, 250-9



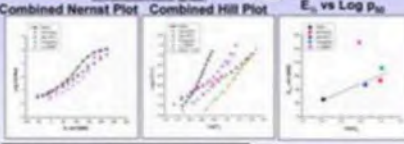
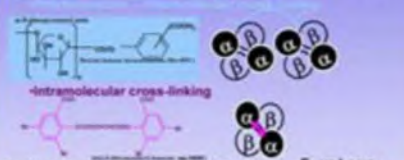
Thermodynamic stability varies by two orders of magnitude (14 kJ) based on identity of X.

Rayman, Weaver, Metzner and Curtiss (2002) unpublished.
Dhungana, Anderson, Metzner and Curtiss (2005) Biochem 44, 3035-40.
Rouhan, Powell, Dhungana, Weaver, Metzner, Curtiss and Fitzgerald (2004) Biochem 43, 1570-74.
Dhungana, Talley, Anderson, Vaughan, Aasen, Metzner and Curtiss (2002) PNAS 100, 3659-64



Best transport can occur by a redox or non-redox mechanism in the periplasm. The thermodynamic stability and reduction potential are both varied by the identity of the synergistic anion. Kinetically labile exchange is possible in the diverse anionic conditions of the periplasm.

Rayman, Weaver, Metzner and Curtiss (2002) unpublished.
Dhungana, Anderson, Metzner and Curtiss (2005) Biochem 44, 3035-40.
Rouhan, Powell, Dhungana, Weaver, Metzner, Curtiss and Fitzgerald (2004) Biochem 43, 1570-74.
Dhungana, Talley, Anderson, Vaughan, Aasen, Metzner and Curtiss (2002) PNAS 100, 3659-64



Sample	E _{1/2} (mV (NHE))	Oxidation n _e	1/n _e	Oxidation P ₅₀
HbA	93	1.3	0.455	2.28
Hemlock	87	0.7	0.384	0.71
Des-BTC	84	0.9	0.315	1.40
OxyCyto	106	0.9	1.028	1.11
aa-OHb	120	1.0	0.461	1.36

Modified Hb Conclusions

Oxygen Transport
Loss of cooperativity
Lower oxygen affinity
T-state stabilization

Anaerobic Reduction Potentials
Loss of cooperativity
E_{1/2} potential increased vs HbA
Normal physiological range
Decreased tendency to form methis.

Banerjee, Hartman, Weaver, Henth, Pines, Aasen and Curtiss (2006) unpublished.
Talley, Banerjee and Curtiss (2002) Meth in Enzymology 303, 187-209.
Rees (2001) Chem Rev 101, 2797-2919

a final word about color...

- color is an extremely powerful tool – use with caution!
 - using too much and/or too many colors drastically reduces effectiveness
 - a limit of 3 colors is usually recommended
 - but not always possible (think pie charts and the like)
 - however, it is possible to substitute pattern for color
 - also avoids potential problems with colorblindness in your audience (it's much more common than you may think)

proximity

- moving elements closer or farther apart to achieve a more organized look
- based on the idea that related items in close proximity will be perceived as a unified group
- your audience will respond by:
 - a) tending to naturally group similar items that are near to each other into a single unit, and
 - b) assuming that items that are not near each other in a design are not closely related to one another

alignment

- arranging elements so that they line up
 - creates order
 - organizes page elements; links disparate groups into a unified whole
 - satisfies the subconscious human desire to line things up (I'm not kidding, this is an actual thing)
 - creates imaginary visual connections

**ignore alignment at
your own peril!**

this poster has some serious alignment issues...

Salvage Archaeology at the Snake River Sandspit Site in Nome, Alaska

Concurrence of No Historic Properties:

• March 10, 1998 - The Corps sent a letter to the SHPO requesting concurrence that their project to improve the harbor at Nome, Alaska "does not have the potential to affect cultural resources."
 • April 29, 1998 - The Corps received a letter from the SHPO, in which she concurred that "there are no historic properties in the area of potential effects."
 Despite this, the Corps thought it was a good idea to have an archaeological monitor on site during the groundbreaking. A private archaeologist familiar with the area was subcontracted to monitor the initial construction during May 2005.



First evidence of the second house pit (Locus B), discovered by Corps archaeologist Margan Grover and full-lunar operator Mike Hahn



Proposed Mitigation (as agreed upon in the draft MOA):

- 1) Write a site report (Data Recovery Report)
- 2) Provide for an accredited museum conservator to visit the City's Cassie M. McLain Memorial Museum and assist in the conservation and curation of the site artifacts on display
- 3) Assist with the accessioning of site artifacts and archaeofauna (bagging, cataloging, and if appropriate photography)
- 4) Provide a museum-quality display case to the City's Cassie M. McLain Memorial Museum
- 5) Present information learned from the site in a series of public lectures in Nome
- 6) Prepare a manuscript on information learned from the site that can be utilized by Nome teachers (grades 5-12)
- 7) Present information learned from the site to a conference of peers
- 8) Submit an article about the site for publication in a peer-reviewed journal (if not accepted, publish elsewhere)

Discovery of the Site (Locus A):

• 1st week of May, 2005 - The subcontracted archaeologist identified the remains of a semi-subterranean house pit while monitoring the construction.
 • The archaeologist took photographs and recovered approximately 25 artifacts, then decided that the house pit was ineligible for inclusion on the National Register of Historic Places and allowed the bulldozers to push the remains into the ocean.
 • May 14, 2005 - The Corps received a letter from the subcontracted archaeologist mentioning the discovery and subsequent destruction of the semi-subterranean house pit.
 • May 26, 2005 - The Corps sent a letter to the SHPO stating that the house pit is "not eligible for the National Register for Historic Places" because it "has lost integrity of design, materials, workmanship, and association."
 • September 27, 2005 - The Corps sent a letter to Nome Eskimo Community (Inlet), apologizing for not consulting after the discovery of the site and stating that they will continue to work with the tribe to mitigate the damage done.
 • October 28, 2005 - The SHPO sent a letter to the Corps in which she concurred with the "finding that the house pit no longer retains sufficient integrity to be eligible" and agreed that "appropriate mitigation would include the development of interpretive signs that discuss the Native history of the Nome area."

Nome Eskimo Community tribal Elder AJ Sablin and Corps archaeologist Helen Lindbeck, excavating house pit B while construction of the treatment tank continues nearby.



Excavating the midden: Corps employees Helen Lindbeck, Anne Wilson, Ouy McCaselli, Mark Caselli, and Margan Grover, Nome Eskimo tribal Elder AJ Sablin, Kawerak employees



The Excavation:

- Occurred from July 26, 2006 to August 26, 2006.
- Involved over 25 community volunteers, including:
 - City of Nome employees
 - Nome Eskimo Community (tribe) employees, members, and tribal Elders
 - Mr. Karlin Ichook, the tribe's Historic Preservation Representative, participated in the excavation every day
 - Kawerak, Inc. (regional non-profit Native corporation) employees
 - Interested Nome citizens
- Involved 6 Corps employees, including biologists and chemists as well as archaeologists and archaeology interns

Excavating house pit B while heavy machinery runs nearby. Nome Eskimo Community employee Karlin Ichook and City of Nome employee Margan Ten Eyck



Discovery of the boiler's circle at the midden. Nome Eskimo Community employee Karlin Ichook, Corps archaeologist Anne Wilson, and others



Excavating the midden: Corps employees Mark Caselli, Ouy McCaselli, Margan Grover, Nome Eskimo Community tribal Elder AJ Sablin, Kawerak employees



Continued Discovery of the Site (Loci B and C):

• July 2006 - The Corps sent out its own archaeologists, Margan Grover, to monitor the continued project construction.
 • July 26, 2006 - Margan identified the remains of a second semi-subterranean house pit. She called the SHPO and left a telephone message about the discovery of the house pit, along with her contact information. She also contacted the City of Nome, Nome Eskimo Community (tribe), and Bering Straits Native Corporation. She called the SHPO again and spoke with a Review and Compliance Archaeologist at the SHPO's office, who agreed that she should excavate a test pit and do some shovel shimming to identify the boundaries of the feature.
 • July 27, 2006 - Margan called the SHPO again and left another telephone message about the site.
 • July 28, 2006 - Margan called the SHPO again and talked with a Review and Compliance Archaeologist at the SHPO's office. Margan told the SHPO archaeologist that she was assuming the site was eligible for the National Register, and that she was going to excavate at least 50% of the site.
 • August 3, 2006 - A meeting was held in Nome between the Corps, the Nome Eskimo Community, and the City of Nome, with the SHPO participating via teleconference, to discuss the discovery of the site and what to do about it.



Corps archaeologist Margan Grover, Nome Eskimo Community tribal Elders AJ and Margaret Sablin, and King Island Native Community tribal Elder at a public viewing of site artifacts

Excavating house pit B. Nome Eskimo Community members Douglas Johnson, Karlin Ichook, and AJ Sablin, Corps archaeologists Helen Lindbeck and Mark Caselli, City of Nome employee Margan Ten Eyck

Corps archaeologist Margan Grover and King Island Native Community tribal Elder at a public viewing of site artifacts

Public Outreach in Nome:

- Public viewing at Old St. Joe's Cathedral (August 10, 2006).
 - Over 200 people attended
- Viewing of artifacts at Nome Eskimo Community's building, for tribal members (August 2006)
- Viewing of artifacts at Kawerak's building during the regional shareholders meeting (August 2006).
- Another public viewing event at Old St. Joe's Cathedral (September 16, 2006)
 - Over 150 people attended
- Margan Grover gave a public lecture at the National Park Service's building (November 2006)



Public viewing of the site artifacts at Old St. Joe's Cathedral



Where We Are Today:

- Multiple drafts of the MOA have been sent out to signatories and concuring parties (on the following dates):
 - November 22, 2006
 - September 22, 2008
 - April 13, 2009
 - August 10, 2009
 - December 14, 2009
- After a stalemated meeting among the signatories to the MOA on December 15, 2009, and numerous unproductive meetings afterwards, advice was informally requested from the Advisory Council on Historic Preservation. On March 19, 2010, the ACHP sent the Corps an edited draft of the MOA.
- A new draft of the MOA is currently under discussion.
- Artifact and faunal analyses are being undertaken by Corps archaeologist Kelly Ehrhardt, and the Data Recovery Report is being drafted.

letter size

Q: how large should you make your type?

- *rule of thumb*: the smallest text on your poster should be clearly legible from 2 to 3 meters away
 - *at a minimum, type should be approximately:*
 - 72 points for titles
 - 48 points for headings
 - 24 points for body copy

***REMEMBER – THESE ARE MINIMUM VALUES!
BIGGER IS ALMOST ALWAYS BETTER
(within reason, of course)***

Poster Overview- 36" by 48"

Sponsoring logo



Title: Should be seen from 4-5 feet away. Times New Roman or Arial, Bold, at 60-80 point text

Name: in 44 pts., bold
Department: 40 pts., bold
Institution: 40pts., bold

Title Line 1
Title Line 2
Name Line (First, MI, Last)
Department of ?
University of California, Davis, 95616



Institution Logo

INSERT ABSTRACT

Abstract: No more than 250 words

INSERT TEXT

INTRODUCTION

Heading: Legible font, bold, 44pts.
Section: Legible font, bold, 36 pts

**INSERT
FIGURE**

Figure 1: 32 pts, bold

INSERT TEXT

RESULTS

Heading: Legible font, bold, 44pts.
Section: Legible font, bold, 36 pts

INSERT TEXT

METHOD

Heading: Legible font, bold, 44pts.
Section: Legible font, bold, 36 pts

**INSERT
FIGURE**

Figure 2: 32 pts, bold

INSERT TEXT

DISCUSSION

Heading: Legible font, bold, 44pts.
Section: Legible font, bold, 36 pts

ACKNOWLEDGEMENTS
Legible font, 36 pts., bold

REFERENCES
Legible font, 36 pts., bold

Introduction

- Or Background
- This is separate from your abstract!
- State the research question and significance of the study
- Include related current investigations
- If you are there, they won't read it so SAY IT!
- Get viewers interested
- Reason you chose to study
- Foundation for your work (Models)
- General topics to specific
- Equivalent to 1 double spaced 12 pt page
- Usually contain citations/references (cite!)
- May have Purpose and Hypothesis embedded
- Generally completes first column

INTRODUCTION

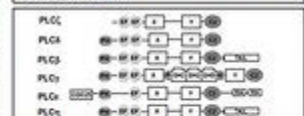
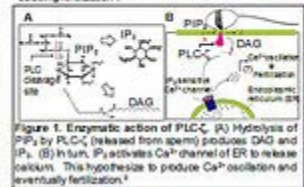
Various implant surface modifications, such as the application of hydroxyapatite (HA) coatings, have been reported to aid in accelerating osseointegration. These improvements in dental implant surfaces have allowed clinicians to replace missing dentitions more effectively and successfully in both fully and partially edentulous subjects. However, failures leading to implant removal still occasionally occur, and these failures occur either early following the installation of the implant or later when the implant supported reconstruction has been in function for various periods of time. In many instances, bacterial adhesion on implant surfaces has a strong influence on healing and long-term outcome of dental implants. In order to improve the life and success of implant therapy, there is a need to investigate the additive anti-bacterial effect in conjunction with the enhancement of rapid bone formation. Since the antimicrobial properties of the silver (Ag) have been exploited for a long time in the biomedical field, the **objective** of this study was to evaluate the initial anti-bacterial adhesion and osteoblast cell proliferation and differentiation on Ag doped HA coating surfaces.

Introduction

- *Francisella tularensis* is highly infectious bacterium that causes the disease tularemia. *F. tularensis* has been classified as a potential biological weapon. There is currently no vaccine approved for human use, and its mechanisms of pathogenesis are poorly understood, in part because of a lack of genetic tools to study this organism.
- *F. tularensis* is divided into several subspecies, including the highly virulent (for humans) subsp. *tularensis*, the moderately virulent subsp. *holarctica*, and the low virulence (for humans) subsp. *novicida*.
- A cluster of genes, the Francisella Pathogenicity Island (FPI), has been shown to be essential for *F. tularensis* virulence.
- The FPI is **duplicated** in subspecies *holarctica* and *tularensis*.
- The *iglC* gene, located in the FPI, is essential for intramacrophage growth and virulence in mice.
- A lack of efficient genetic tools have hampered the study of subsp. *holarctica* and *tularensis*. Moreover, the duplication of FPI genes has made the study of these genes in the more virulent subspecies cumbersome.
- We have developed a system for gene disruption in *F. tularensis* that utilizes a retargeted Group II intron.
- This "Targetron" system works at high efficiency in subsp. *tularensis*, *holarctica*, and *novicida*, and generates unmarked disruptions

INTRODUCTION

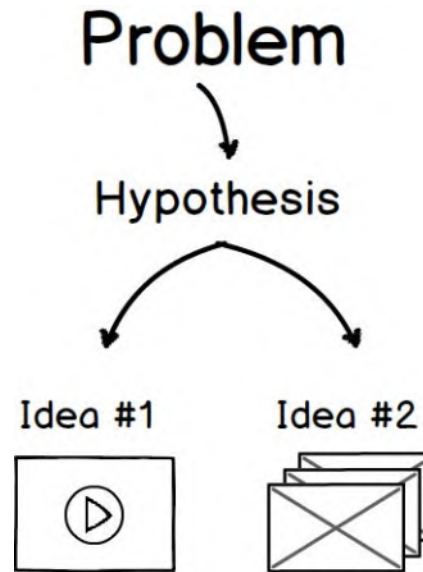
• Phospholipase Cαs (PLC-α), a member of phospholipase C family, was identified as the sperm factor responsible for activating oocytes, and thereby causing fertilization.



• Bioinformatic analysis through sequence alignment and homology modeling revealed that the calcium binding region of C2 domain as well as the catalytic Y-region of PLC-α were expected to be significantly different from empirically determined PLC-β.

Purpose and Hypothesis

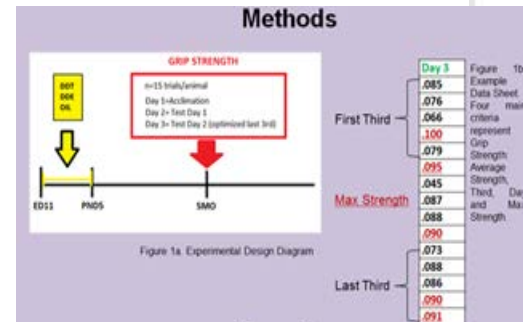
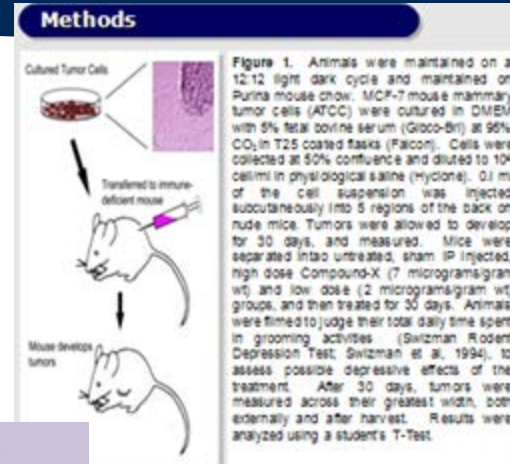
- Can be embedded in Introduction, but
- Sometimes a separate section, to emphasize
- Purpose or Objective, Aim, Goal, etc.,
- Why you did experiment?
- “The purpose of this project...”
- Good for Student Conference
- (Promotes solid judging)
- Hypothesis
- Same as for abstract



hypothesis

Methods

- Describe procedures and methods in detail to allow observer to understand how, when, where data was obtained.
- Describe challenges and lessons learned
- Text with subheadings
- Can include a flow chart to summarize
- May include citations
- Make sure to include:
 - subjects
 - experimental design
 - drugs and equipment used
 - statistical methods
 - why you chose the method



MATERIALS

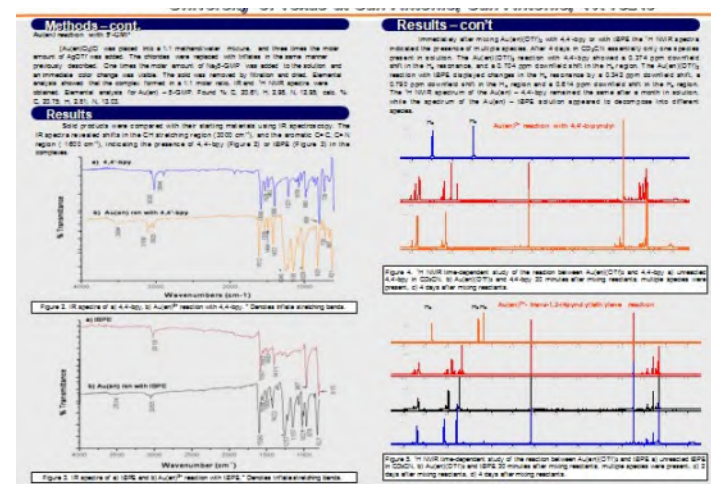
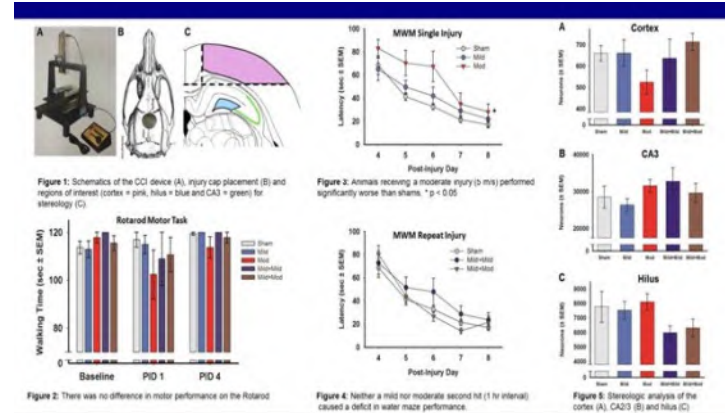
Coating process by Sol-gel methods: Commercially pure titanium (Ti) disks of (15 mm diameter and 2.0 mm thick) were used as substrates. All disks were wet ground with 240, 400 and 600 grit silicon carbide papers, followed by ultrasonic degreasing using acetone and ethanol for 10 minutes each. Deionized water was used for rinsing the disks between applications of each solvent. A passivation procedure was then conducted by exposing the Ti disks to a 40% volume nitric acid solution at room temperature for 30 minutes (ASTMF86-91).

Prior to coating on the passivated Ti surfaces, hydroxyapatite (HA) and 1 wt% silver (Ag)-doped HA (HA-AG) sol were produced. The HA sol was prepared by reacting calcium nitrate tetrahydrate [Ca(NO₃)₂·4H₂O] with methyl alcohol to produce calcium precursors. Phosphorus precursors were also prepared by reacting triethyl phosphite [(OC₂H₅)₃P] in 0.03 ml acetic acid (CH₃COOH). The two precursors were then mixed and 0.1 mol of DCCA (Drying Control Chemical Additive) was added to the mixture. All reactions were carried out in argon atmosphere. Similar to the HA sol, AgHA1.0 sol was produced by mixing the calcium and phosphorus precursors with 1.0 wt % silver nitrate (AgNO₃) and 0.1 mol DCCA. AgNO₃ was chosen for Ag doping because of the easy decomposition of nitrates during heating.

The prepared HA and HA-AG sol were then coated on passivated Ti surfaces by spin coating at 5,000 rpm for 50 seconds. The coated-Ti surfaces were immediately dried at 70°C for 12 hours, followed by a heat treatment at 650°C for 3 hours. The HA-coated surfaces were used as controls in this study. All samples were autoclaved prior to materials characterization and all culture experiment.

Results

- Largest section
- Vary with field
- Often two middle columns
- Summarizes the data and reports results of statistical tests and analyses (- or +)
- Draw implications and considerations
- Don't present raw data
- Make Image-based; use few words
- Maximize use of Figures
 - Make them simple
 - Must be easily seen
 - Make all lines wide enough
 - All text large enough!
 - Consistent axes across poster
- Minimize use of tables
 - Difficult to grasp quickly
- Use figure legends/captions as text
- Put text near figure it's describing
- ~1 paragraph per image/image group



Conclusions/Discussion

- Or discussion or summary
- Very few words
- Bullets good
- Bigger font if needed
- *Summarize “take home” results
 - Interpret the meaning or implications of your results
 - Mention any alternative explanation for results or unanticipated results
- *How did hypothesis work out?
- *Tie back to real world problem
- *Why Important/Implications
- Aim for:
 - Reasonable conclusions were given and strongly supported with evidence
 - Conclusions were compared to hypothesis and their relevance in a wider context was discussed

Conclusions

- We have adapted a group II Intron-based system for efficient targeted mutagenesis of *F. tularensis*
- This system is effective and efficient across *F. tularensis* subspecies: *tularensis*, *holarctica*, and *novicida*
- This system was used to successfully disrupt *blaB* found in single copy in the *F. tularensis* genome.
- This system was used to successfully disrupt both copies of the duplicated *igIC* gene in a single manipulation.
- Targetrons should be a valuable genetic tool for the dissection of *F. tularensis* pathogenesis.

This study was supported by NIH P01AI07996 to MKK, and NIH GM060426 to SAR.

SUMMARY AND CONCLUSIONS

In this study, x-ray diffraction analyses of Ag-doped HA thin film by xRD method indicated peaks corresponding to HA. Contact angles for HA-Ag surfaces were observed to be significantly lower when compared to HA surfaces. *In vitro* bacterial adhesion study indicated a significantly reduced number of *S. glaucopalis* and *S. aureus* on HA-Ag surface when compared to HA surface, whereas significantly reduced adhesion of viable *S. aureus* was observed on HA-Ag surface when compared to Ti and HA surfaces. Additionally, no significant difference of osteoblast activity was observed on three different surfaces tested. Overall, it was concluded that the 1% Ag-doping on HA surfaces were non-toxic to osteoblast cells. Additionally, it was also concluded that the 1% Ag doping was effective in reducing bacterial adhesion.

References/ Literature Cited

- Include sources/resources that supported your work
- If someone's work is cited (usually in introduction), you must include a reference
- Generally "short" (title optional)
- Can use smaller font if needed

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1. Capitman, John Amson. (2007). *Growing a Healthier San Joaquin Valley*. Fresno, CA: Central Valley Health Policy Institute.
2. Riordan, Deborah (2007, June). *Health Professional Shortages in the San Joaquin Valley: The Impact on Federally Qualified Health Clinics*. Presented at California State University Fresno, Fresno, CA.

Images borrowed from:

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2. Wikimedia Commons. (2006). Map of California highlighting Merced County. Retrieved September 20, 2008, from http://commons.wikimedia.org/wiki/Image:Map_of_California_highlighting_Merced_County.svg.

Acknowledgements

- Acknowledge the faculty and staff who supported you.
- Thank people
 - Mentor
 - Research group
 - Technical assistance, etc.
- Reveal possible conflicts of interest
- Identify funding utilized
 - CAMP, LSAMP-NSF, NIH, etc.
- Font can be smaller than rest of text

Thank You!



Acknowledgements

We would like to thank Mr. Angus Rhododendrum and Suzanne McPerkins for their technical assistance.

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Acknowledgements

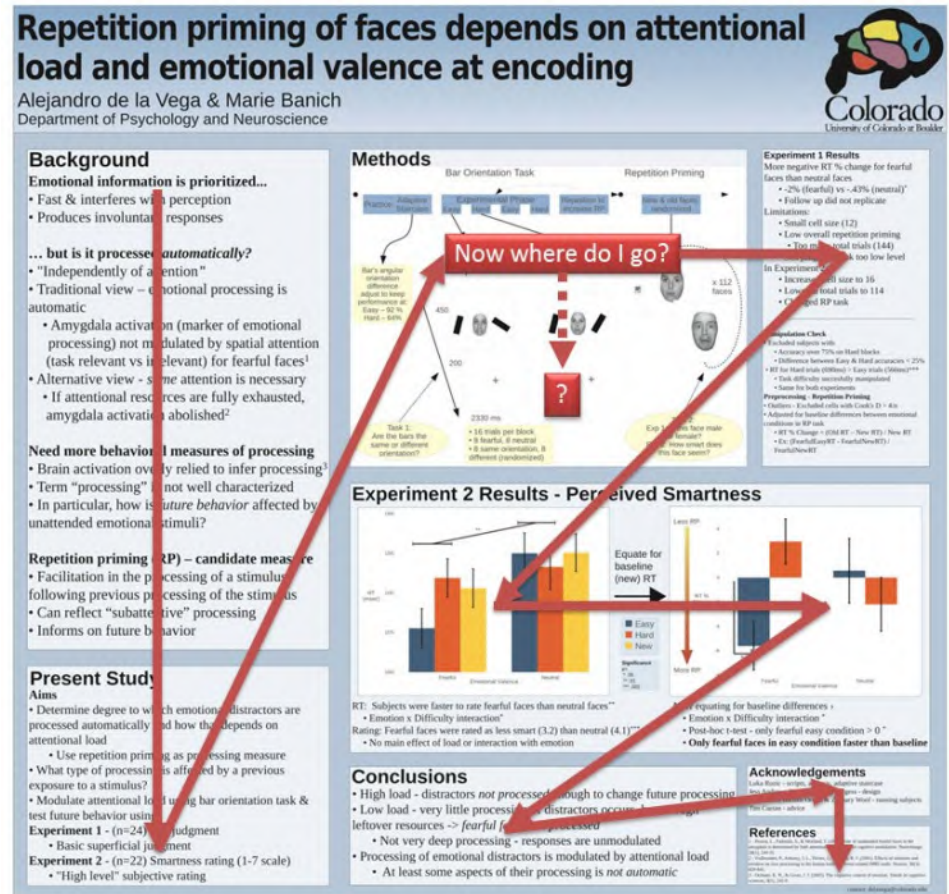
✧ We would like to thank:

- ✧ Our mentors Dr. Stergios Roussos and Dr. Maria G. Pallavicini for their support during the long and strenuous journey of establishing ITCH.
- ✧ All participating ITCH members whose hard work has made this organization a possibility.
- ✧ All community leaders, community professionals, and UCM faculty whose devoted time and patience has been greatly appreciated and has helped with the establishment of ITCH.

Remember to check that:

- All expected components are present, clearly laid out, and easy to follow in the absence of presenter
- The text is concise, legible, and consistently free of spelling or typographical errors; the background is unobtrusive
- The figures and tables are appropriate and consistently labeled correctly
- Photographs/tables/graphs improve understanding and enhance the visual appeal
- For ideas can go to Pimp My Poster:

<http://www.flickr.com/groups/688685@N24/>





High Resolution Reconstructions of Sea Surface Temperatures from Pacific Geoduck Growth Increment Chronologies

Matthew J. Stuckey¹ & Bryan A. Black²

¹University of California, Berkeley, Berkeley CA 94720, USA.

²Oregon State University, Hatfield Marine Science Center, Newport OR 97365, USA.

National Science Foundation Research Experience for Undergraduates

Hatfield Marine Science Center, Oregon State University

March 2008 Ocean Sciences Meeting, ASLO

Introduction

- The Pacific geoduck clam (*Panopea abrupta*) - ranges from Kodiak to California

- Found in the sandy mud of lower intertidal and subtidal zones



- Burrows into sediment ~ 3 feet
- Filter feeds through siphon (left)



- Form annual growth increments

- Width relates to sea surface temperatures (SST)

- Long-lived. Up to 150+ years; excellent chronometers of past environmental variability

Abstract

We demonstrate the potential for reconstructing sea surface temperatures along coastal British Columbia, Canada, using four chronologies developed from the growth increment widths of Pacific geoduck clams (*Panopea abrupta*). The four geoduck chronologies range from the southernmost to northernmost borders of British Columbia and were developed using standard tree-ring (dendrochronology) techniques, including crossdating. Although each geoduck chronology significantly correlated with local records of sea surface temperatures (SST), correlations were unstable over time. In every chronology, the relationship with SST would occasionally dissolve for a period lasting approximately ten years. The limiting of these climate-growth breakdowns was inconsistent and varied among the chronologies. For any one chronology, inconsistent climate-growth relationships represented a significant complication for developing accurate SST reconstructions. However, when geoduck chronologies were combined via simple averaging, irregularities in climate-growth relationships canceled out one another to yield strong and highly stable SST reconstructions. Final SST reconstructions captured more than 60% of the variance in the instrumental record and extended more than 120 years, capturing the historical range of variability and providing context for current climatic trends.

Discussion

- Sea surface temperatures are recorded at nine lighthouses off the coast of British Columbia



Figure V: Sea surface temperatures recorded at nine lighthouses off the coast of British Columbia



- However, correlations with SST are inconsistent over time (Figure V)

- Solution: average multiple chronologies

- Cancel out irregularities and forms more stable climate-growth relationships

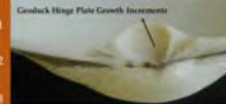
- Example: Average of Tree Nob and Puget Sound is much more stable (Figure V)

- Geoduck chronologies strongly correlate with SST records
- Potential tool for SST reconstructions

Methods

- We apply crossdating: a technique used in tree-ring data to ensure that all growth increments have correctly been identified, ensuring annual resolution of the final chronology

Example: tree cores taken in 2000



- Crossdating is based on the tendency of climate to synchronize growth patterns of all samples from a site (poor climate year = narrow ring; favorable year = wide ring)

- Growth 'bar codes' are crossmatched among all samples. If one sample is out of alignment with the others, then an increment was likely overlooked



Figure 1: Geoduck measurements (and best-fit curves C) (individuals)



1. Thin sections of geoduck hinge plates (above) are measured using digital imaging software

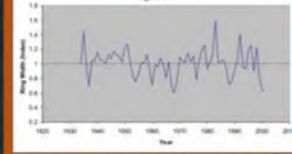
2. Measurements contain age-related growth declines
- 3a. Divide measurements by the values predicted by the best-fit function (Figure II)

- 3b. Remove declines via detrending
- 3a. Fit a negative exponential function to each set of geoduck measurements (Figure I)

4. Master chronology: average of all detrended time series from the site (Figure III)

Results

Brady's Beach Chronology (Figure III)



- Chronologies developed from four sites off the coast of British Columbia (below)



- Master chronology from Brady's Beach (Figure III) spans from 2001 back to 1934

- Tree Nob (TN): 1888 - 2002
- Bartlett (BA): 1935 - 2003
- Brady's Beach (BB): 1934 - 2001
- Puget Sound (STR): 1888 - 1999

- All chronologies are fully crossdated and annually resolved (Figure IV)

- Puget Sound (STR) chronology developed by Dr. Bryan Black for his ongoing mentorship and tremendous help with this project

Figure IV: Geoduck chronologies for all four sites

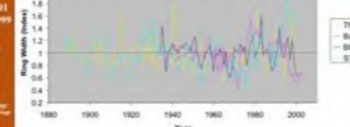
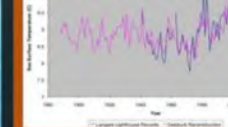


Figure VI: Lighthouse SST Reconstruction



- Due to geoduck longevity, sea surface temperature reconstructions substantially predate instrumental records (Figure V)

- Example: Average of Tree Nob and Stron chronologies explains 50% of the variance in the SST record at Langara Lighthouse (left), using linear regression

- SST reconstructions provide context for interpreting current climatic trends

- Geoduck chronologies can be further combined with those from trees, mussels, and fish (right)

- Potential applications:
 - Compare diverse ecosystems
 - Multiproxy reconstructions



Acknowledgements

- Many thanks to...

- HMSC & OSU for hosting the REU program
- NSF for funding this project under award OCE-0648515
- Pacific Biological Research Station of the Department of Fisheries and Oceans Canada for providing our geoducks
- Inching Chiving, Dr. George Bowler, and many others at Hatfield for shaping the REU experience
- Rose Kormanian for developing the Tree Nob and Bartlett chronologies
- Dr. Amy Stron for developing the Puget Sound chronology
- Dr. Bryan Black for his ongoing mentorship and tremendous help with this project

For more information, please contact Matt at mstuckey@berkeley.edu or Bryan at bryan.black@oregonstate.edu

Examples of Excellent Posters

Expression, purification, and crystallization of recombinant mouse phospholipase c-zeta (PLC-ζ)



Pang, Allan

BSc Genetics | School of Biosciences, Cardiff University, Cardiff, Wales CF10 3US



ABSTRACT

The aim of this study is to express and purify recombinant PLC-ζ protein fit for structure identification through X-ray crystallography. To date, there is no available empirical data of the 3D structure of PLC-ζ. The identification of the structure is crucial as it presents information that will facilitate understanding of the protein mechanism and regulation, both of which remained unknown. Bioinformatic analysis was also utilized to draw initial structural information, specifically on the domain differences of PLC-ζ and empirically determined structure PLC-β1.

INTRODUCTION

Phospholipase C-zeta (PLC-ζ), a member of phospholipase C family, was identified as the sperm factor responsible for activating oocytes, and thereby causing fertilization.

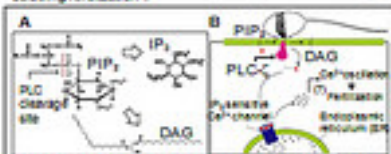


Figure 1. Enzymatic action of PLC-ζ. (A) Hydrolysis of PIP₂ by PLC-ζ (released from sperm) produces DAG and IP₃. (B) In turn, IP₃ activates Ca²⁺ channel of ER to release calcium. This hypothesize to produce Ca²⁺ oscillation and eventually fertilization.¹

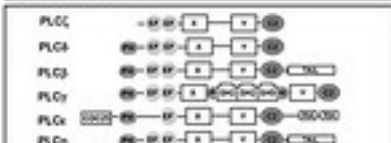


Figure 2. PLC Domain Organization. PLC-ζ consists of EF-hand domain, catalytic (X and Y) domain and C2 domain. These domains are also found in other PLC isoforms. PLC-β showed closest resemblance to PLC-ζ.^{1,2}

Bioinformatic analysis through sequence alignment and homology modelling revealed that the calcium binding region of C2 domain as well as the catalytic Y-region of PLC-ζ were expected to be significantly different from empirically determined PLC-β1.

EXPERIMENTAL RESULTS

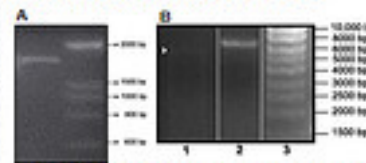


Figure 3. Molecular cloning of PLC ζ 124 construct. (A) Two step PCR amplification successfully produce a PLC- ζ construct with 6-HIS and 3C protease cleavage site (1813 bp in size). (B) Construct was ligated into pET102/D-TOPO vector. This is validated by restriction digest using ClaI. Vector alone (1) showed a lower band compared to vector with the construct (2).

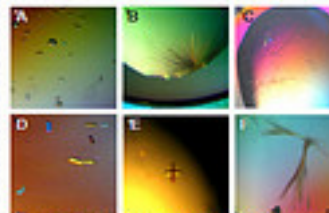


Figure 5. Crystallisation of PLC ζ 124 Construct. Six different screening conditions were found to be suitable for crystallizing the protein. Crystals were confirmed to be protein due to birefringence characteristic under polarised light. Protein crystals A-E were needed to be optimized to obtain larger crystal. Protein crystal F was tested for X-ray diffraction. Preliminary analysis, however, revealed that X-ray diffraction pattern was hindered by presence of high salt concentration.

EXPERIMENTAL PROCEDURE

PLC ζ 124 construct was generated using two-step PCR to incorporate 6-HIS and 3C protease recognition site. Construct was ligated into pET102-D/TOPO vector and transformed into *E. coli* BL21(DE3). Protein expression was induced using IPTG. Bacterial lysis was carried out using French Press. Protein construct was captured using Ni²⁺ beads and cleavage of the protein from the tags were completed by 3C protease. Further purification was carried out using FPLC (ion-exchange and gel filtration chromatography). Crystallization of protein was carried out using sitting drop vapor-diffusion method.

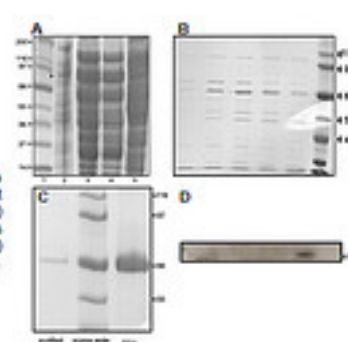


Figure 4. Protein expression and purification. (A) Molecular weight marker (lane 1). Protein bands after IPTG induction (lane 2). Protein construct migrated at 83 kDa. Nickel beads were used to capture protein (lane 3) and the beads were washed with high salt concentration (lane 4) to remove contaminants (lane 5). (B) Fractions collected after cleaved protein (by 3C protease) passed through FPLC-ion exchange method. Bands migrating at around 66 kDa (which corresponds to PLC ζ 124 protein) are found. (C) Further purification through FPLC-gel filtration method to obtain purified sample. (D) To verify that indeed the protein band is PLC- ζ , Western blot was employed using antibody specific to X/Y linker.

CONCLUSION

- It was predicted from the bioinformatic analysis that PLC-ζ will fold in the same general topology as PLC-β1 (without PH domain).
- Specific differences were predicted to be in the Y-region of catalytic domain and C2 domain.
- This hypothesis, however, was not tested as X-ray diffraction data collection failed. This was due to presence of high salt concentration. Future study may need to alter buffer systems to obtain this structural data.
- The recombinant mouse PLC-ζ was successfully expressed, purified and crystallized. However, the expression level is low.
- It was assumed that the protein was catalytically active in bacterial cell and overproduction caused toxicity and metabolic stress.
- To obtain higher protein expression, different vector system and bacterial strain may be used.¹
- The ultimate aim is to reveal the 3D structure of human PLC-ζ. However, the expression of the human PLC-ζ was much lower. It is possible though to construct a more accurate model if an empirical 3D structure of mouse PLC-ζ was determined and used as a template.

ACKNOWLEDGEMENTS

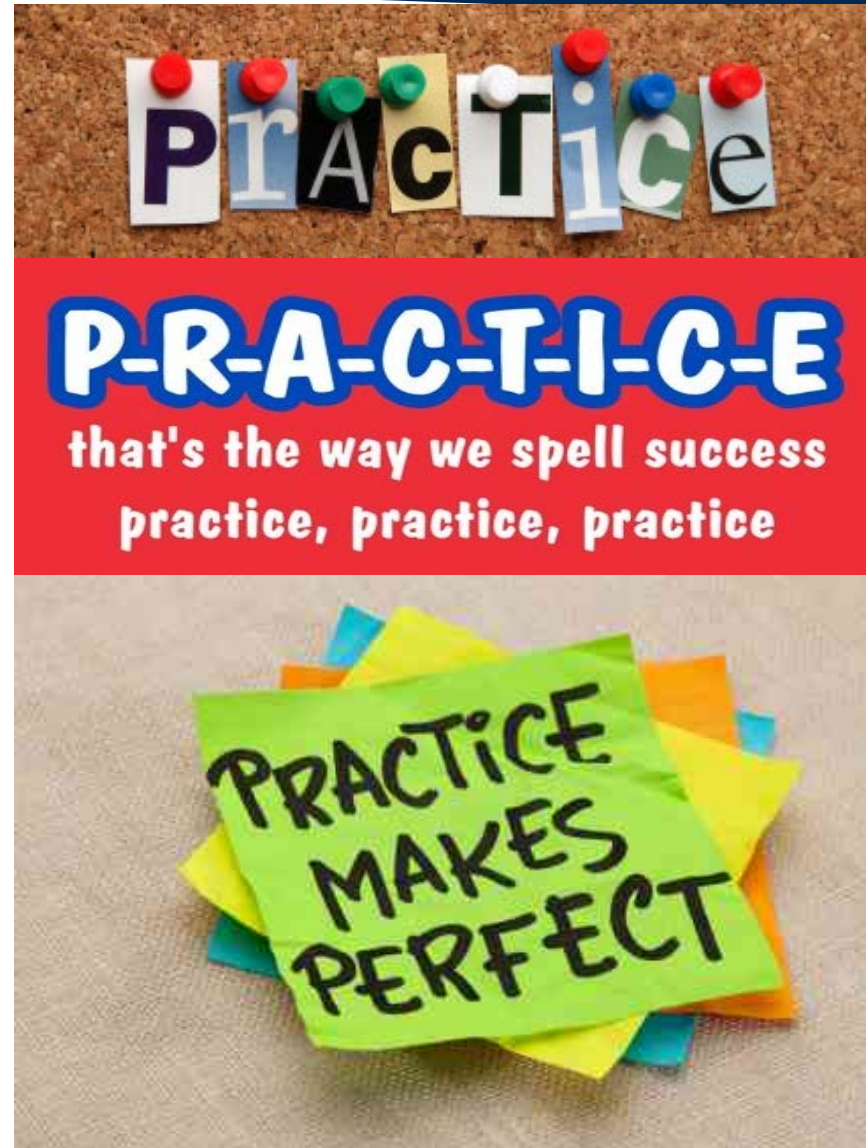
I would like to thank Dr A. Rosbash for the antibody used in Western blotting, Dr LG D'Arcy for the PLC ζ 124 construct, 3C protease and his supervision, Mr Peter Wilson for technical support.

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Practice Makes Perfect

- Finish early enough to practice
- MAKE SURE TO PRACTICE!
- Develop 5 minute presentation
- Know first sentence
- What to say for each figure (3 pts...)
- Transitions between figures
- What to point at for each figure
- Practice with lab mates and laypersons
- Run through ENTIRE poster
- Be friendly
- Don't sound like you've memorized
- Be excited about your work
- Remember to refer to your poster!
- They may interrupt with questions
- Pause long enough for them look at figure
- Know what questions may be asked....
 - Can practice them



First Contact

- Stand to left of poster (where start reading)
- Take initiative
- Smile, but stay near poster
- If they come closer
- Say, “Hello” and shake hands
- Give name. Get their name.
- Give level, and university (UC Davis)
- Ask if they’d like “you to walk them through your poster”
 - YES? Then GO!
- This is work that I performed this summer in the ___ program in the laboratory of Dr. _____ at UC Davis.
- (Optional) Ask if they are familiar with this field of research
 - No- More introduction, careful with acronyms
 - Yes- Can go more quickly through intro



The Flow of Things

- Start with Intro that will catch them
 - No pointing if you have no figure!
- Move to Methods
 - Briefly summarize
- Move to Results
 - Longest section
- Indicate at beginning if did not work
- Walk thru all figures
- Transition to Conclusions
- Say Conclusions
- Acknowledgements (optional)
- Any Questions?

Repetition priming of faces depends on attentional load and emotional valence at encoding
 Alejandro de la Vega & Marie Banich
 Department of Psychology and Neuroscience
 University of Colorado at Boulder

Background
 Emotional information is prioritized...
 • Fast & interferes with perception
 • Produces involuntary responses

... but it processes automatically?
 • "Independently of attention"
 • Traditional view - emotional processing is automatic
 • Amygdala activation (marker of emotional processing) not modulated by spatial attention (task relevant vs irrelevant) for fearful faces!
 • Alternative view - some attention is necessary
 • If attentional resources are fully exhausted, amygdala activation is abolished?

Need more behavioral measures of processing
 • Brain activation overly relied to infer processing!
 • Term "processing" is not well characterized
 • In particular, how is future behavior affected by unattended emotional stimuli?

Repetition priming (RP) - candidate measure
 • Facilitation in the processing of a stimulus following previous processing of the stimulus
 • Can reflect "subattentive" processing
 • Informs on future behavior

Present Study Aims
 • Determine degree to which emotions/distractors are processed automatically and how this depends on attentional load
 • Use repetition priming as processing measure
 • What type of processing is affected by a previous exposure to a stimulus?
 • Modulate attentional load using bar orientation task & test future behavior using RP judgment
Experiment 1 - (n=24) Judgment
 • Basic superficial judgment
Experiment 2 - (n=22) Smartness rating (1-7 scale)
 • "High level" subjective rating

Methods
 Bar Orientation Task
 Repetition Priming

Experiment 1 Results
 More negative RT % change for fearful faces than neutral faces
 • ~2% (fearful) vs ~43% (neutral)
 • Follow up did not replicate
 Limitations:
 • Small cell size (12)
 • Low overall repetition priming
 • Too many neutral trials (144)
 • Too few fearful trials (12)
Experiment 2
 In Experiment 2
 • Increased cell size to 16
 • Larger number of trials to 114
 • 20% RP task
Replication Check
 Fearful subjects only
 • Accuracy over 75% on Start trials
 • Difference between Easy & Hard conditions > 25%
 • RT for Start trials (difficult) < Easy trials (Easier)***
 • Task difficulty successfully manipulated
 • Same for both experiments
Priming - Repetition Priming
 • Condition - Easy trial with Cook-Di & Ais
 • Adjusted for baseline differences between emotional conditions in RP task
 • RT % Change - Old RT - New RT / New RT
 • % Change (RP) - Fearful/New RT / Fearful/Old RT

Experiment 2 Results - Perceived Smartness

RT: Subjects were faster to rate fearful faces than neutral faces**
 • Emotion x Difficulty interaction*
 Rating: Fearful faces were rated as less smart (3.2) than neutral (4.1)
 • No main effect of load or interaction with emotion

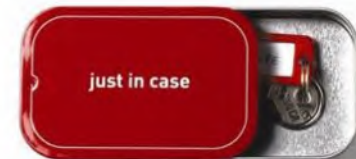
Conclusions
 • High load - distractors not processed enough to change future processing
 • Low load - very little processing of distractors occurs, leaving leftover resources -> fearful faces
 • Not very deep processing - responses are unmodulated
 • Processing of emotional distractors is modulated by attentional load
 • At least some aspects of their processing is not automatic

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References

The Just in Case Items:

- Carry your poster with you at all times (do not leave as checked baggage)
- Dress for situation
 - Follow culture of conference
 - Student conference – suit...or minimally khaki's
 - Comfortable shoes
- Be there on time!
- Don't leave unless it is very important to do so (if so, leave a friend there momentarily)
- Mini-poster printed out
- Pins
- Water
- Business cards (check your email!)
- Notebook
 - Networking – write down ideas and names!



Remember

- If you network please remember to email them!
- Keep promises that you've made
- Hang poster outside your lab
- Sample posters can be seen online
 - google search
- A “template” can be found at:
 - <http://urc.ucdavis.edu/conference/index.html>



References and Sites to Visit

- How to Write an Abstract: <http://vimeo.com/3968357>
- How to Present: <http://www.vimeo.com/3968357>
- Click [here](#) for PosterTalk helpful presentation, which was used to create parts of this presentation. Thank you Dr. Gail P. Taylor!
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- Colin Purrington: Advice for designing scientific posters.
<http://www.swarthmore.edu/NatSci/cpurrin1/posteradvice.htm>
- Knowledge Management in Health Services; HSERV 590A: Creating a Poster Using MS PowerPoint – University of Washington
<http://courses.washington.edu/~hs590a/weblinks/poster.html>
- Creating Effective Poster Presentations – Hess and Liegel.
<http://www4.ncsu.edu/~grhess/posters/>
- University of Buffalo- Designing effective poster presentations
<http://ublib.buffalo.edu/libraries/units/sel/bio/posters.html>
- University of Kansas- Jeff Radel
http://www.kumc.edu/SAH/OTEd/jradel/Poster_Presentations/PstrStart.html

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