

TIPS & TRICKS FOR MAKING A GREAT PRESENTATION



Focused on: creating impactful posters &
communicating your research

Shea Harris

ABI Outreach Coordinator

Maureen Dolan

Associate Professor Dept. of
Biological Sciences and
Director Biotechnology
Program

Purpose of a Research Poster

- Get your main point(s)* across
- Summarize your work
- Advertise your research and lab
- Help start a conversation with other scientists and potential colleagues/collaborators
- A way to network, start a collaboration, get a job or funding, find a UG/graduate research advisor

** Talk more about this later!*

Features of an effective poster

- Is a visual tool

- Has 3 qualities:

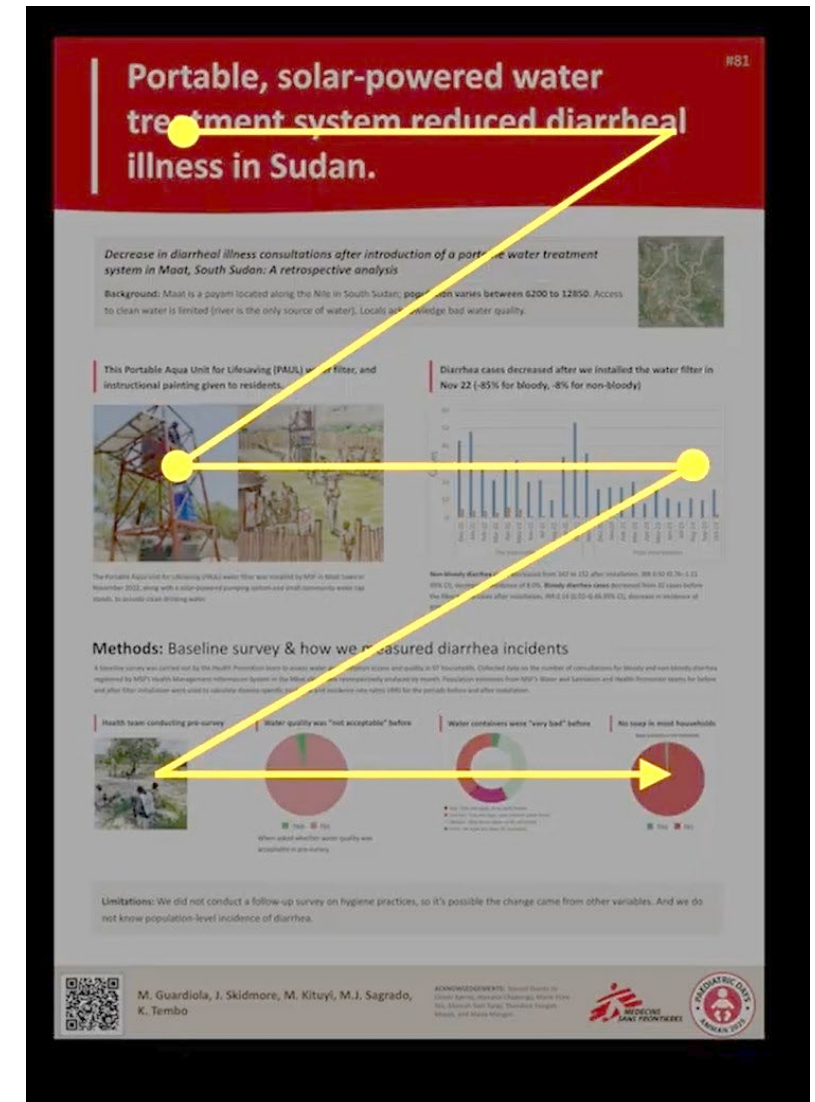
Focused

Graphic

Ordered

- Focused on a single message
- Let graphs and images tell the story
- Keeps the sequence well-ordered and obvious

- Addresses the target audience
- Can be read from >5-6 ft
- Can convey your message in <1min



Planning: Know your audience

- 3 categories of readers in most audiences:
 - Specialists
 - Closely related fields
 - Unrelated fields
- First, what meeting are you going to? Guidelines?
- To reach all audiences
 - **Provide context** - Think big picture; what is the problem? Why is it important?
 - **Use plain language.**
 - **Avoid jargon and acronyms***
 - **Interpret your findings**

Planning: Define your message

- What is the **1** thing you want your audience to learn?
- **Focus** on your message throughout the poster.
- **Simple** messages are more memorable.
- Which details are absolutely **essential** for conveying your message? What can you say orally?
- Omit anything that does not reinforce your message.
- Simplify verbiage, reduce sentence complexity

Construction: Title and formatting

- Title should be ≥ 5 cm tall (readable from 2 m away).
- Title are easiest to read in sentence case.
- Using subtitles to outline the story of the poster
- Font type??
- Font size??

TITLES ARE DIFFICULT TO READ IN ALL UPPERCASE

Luctous Aurelius, Titus Cassius, Demetrius Gannicus, Lucretia Glaber
Universitatis Scientia

Titles are Easier to Read in Title Case

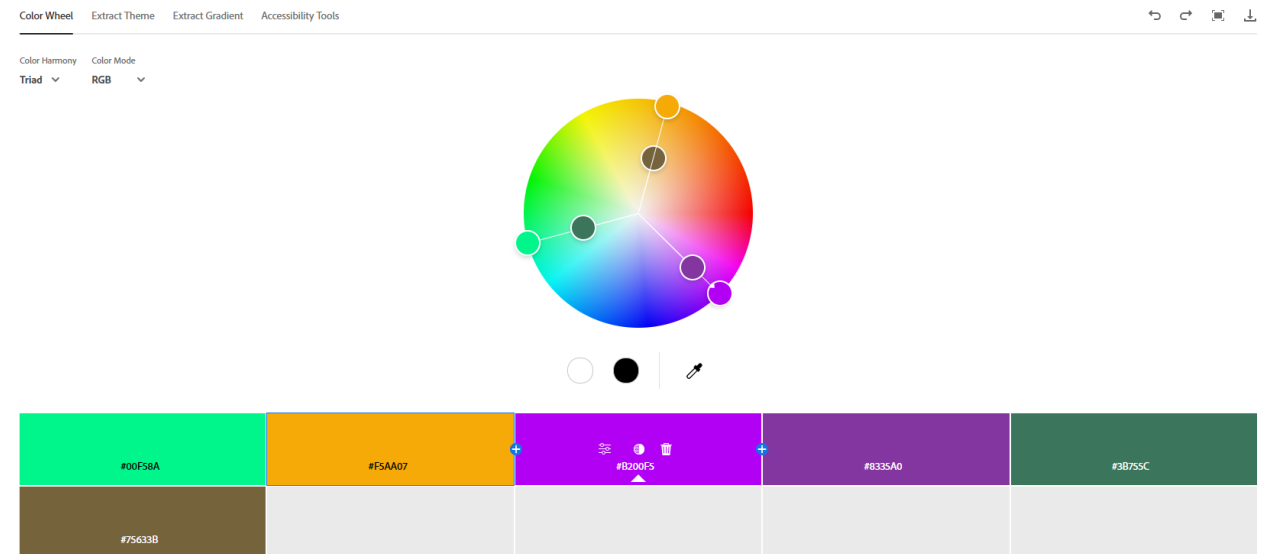
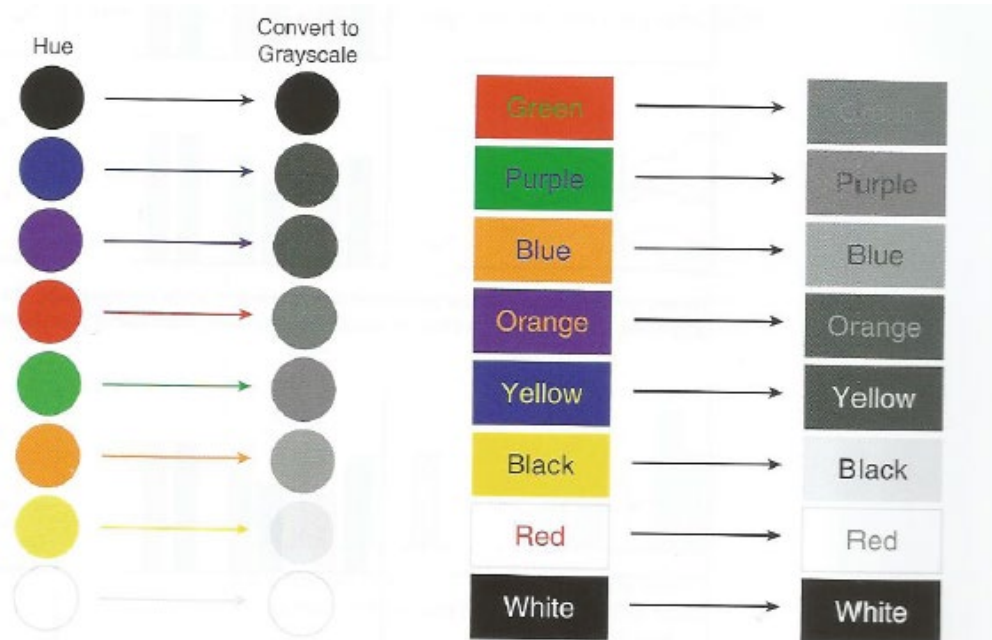
Luctous Aurelius, Titus Cassius, Demetrius Gannicus, Lucretia Glaber
Universitatis Scientia

Titles are easiest of all to read in sentence case

Luctous Aurelius, Titus Cassius, Demetrius Gannicus, Lucretia Glaber
Universitatis Scientia

Construction: Colors & Contrast

- **Cool** (e.g., blue or green rather than yellow or red) and **light** color background with dark color letters for contrast.
- Stick to a theme of **2-3 colors** (in a consistent pattern).
- Overly bright colors attract attention, but wear out readers' eyes.
- Online tools available to help!



color.adobe.com/create/color-wheel

Construction: Color vision deficiencies

- Consider **color vision deficiencies**, especially when designing graphics



Most common
deficiency: green
and red cannot be
distinguished



Normal Vision



Protanopia



Deuteranopia



Tritanopia

Construction: Edit! Edit! Edit!

- **Simplify verbiage**, Reduce sentence complexity, Delete details.
- If it's not relevant to your message, **remove it!**
- Are your objective and **main message** obvious?
- Will readers be able to **contact you**?
- Did you include **acknowledgments**?
- References typically not needed. If pivotal, usually ≤ 3 .
- Get **feedback**. Who?
- Look at others' posters and list what you like and dislike

To QR code or not QR code?

- QRs can be a helpful, space saving option
- Provides additional **information repository**
- Behind a QR Code:
 - Place recent publications
 - References for the poster
 - Key Manuscripts
 - Additional data and figures
 - Summary and Lab Contact info
- BE intentional with your message.





PIGS IN SPACE: EFFECT OF ZERO GRAVITY AND AD LIBITUM FEEDING ON WEIGHT GAIN IN CAVIA PORCELLUS

Colin B. Purrington
6673 College Avenue, Swarthmore, PA 19081 USA

ABSTRACT:

One ignored benefit of space travel is a potential elimination of obesity, a chronic problem for a growing majority in many parts of the world. In theory, when an individual is in a condition of zero gravity, weight is eliminated. Indeed, in space one could conceivably follow ad libitum feeding and never even gain an gram, and the only side effect would be the need to upgrade one's stretchy pants ("exercise pants"). But because many diet schemes start as very good theories only to be found to be rather harmful, we tested our predictions with a long-term experiment in a colony of Guinea pigs (*Cavia porcellus*) maintained on the International Space Station. Individuals were housed separately and given unlimited amounts of high-calorie food pellets. Fresh fruits and vegetables were not available in space so were not offered. Every 30 days, each Guinea pig was weighed. After 5 years, we found that individuals, on average, weighed nothing. In addition to weighing nothing, no weight appeared to be gained over the duration of the protocol. If space continues to be gravity-free, and we believe that assumption is sound, we believe that sending the overweight — and those at risk for overweight — to space would be a lasting cure.

INTRODUCTION:

The current obesity epidemic started in the early 1960s with the invention and proliferation of elastane and related stretchy fibers, which released wearers from the rigid constraints of clothes and permitted monthly weight gain without the need to buy new outfits. Indeed, exercise today for hundreds of million people involve only the act of wearing stretchy pants in public, presumably because the constrictive pressure forces fat molecules to adopt a more compact tertiary structure (Xavier, 1965).

Luckily, at the same time that fabrics became stretchy, the race to the moon between the United States and Russia yielded a useful fact: gravity in outer space is minimal to nonexistent. When gravity is zero, objects cease to have weight. Indeed, early astronauts and cosmonauts had to secure themselves to their ships with seat belts and sticky boots. The potential application to weight loss was noted immediately, but at the time travel to space was prohibitively expensive and thus the issue was not seriously pursued. Now, however, multiple companies are developing cheap extra-orbital travel options for normal consumers, and potential travelers are also creating news ways to pay for products and services that they cannot actually afford. Together, these factors open the possibility that moving to space could cure overweight syndrome quickly and permanently for a large number of humans.

We studied this potential by following weight gain in Guinea pigs, known on Earth as fond of ad libitum feeding. Guinea pigs were long envisioned to be the "Guinea pigs" of space research, too, so they seemed like the obvious choice. Studies on humans are of course desirable, but we feel this current study will be critical in acquiring the attention of granting agencies.

CONCLUSIONS:

Our view that weight and weight gain would be zero in space was confirmed. Although we have not replicated this experiment on larger animals or primates, we are confident that our result would be mirrored in other model organisms. We are currently in the process of obtaining necessary human trial permissions, and should have our planned experiment initiated within 80 years, pending expedited review by local and Federal IRBs.

ACKNOWLEDGEMENTS:

I am grateful for generous support from the National Research Foundation, Black Hole Diet Plans, and the High Fructose Sugar Association. Transport flights were funded by SPACE-EXES, the consortium of wives divorced from insanely wealthy space-flight startups. I am also grateful for comments on early drafts by Marilena Athletic Club, Corpus Christi, USA. Finally, sincere thanks to the Cuy Foundation for generously donating animal care after the conclusion of the study.

LITERATURE CITED:

NASA. 1982. Project STS-XX: Guinea Pigs. Leaked internal memo.
Sokulic, S.R., D. D. Lukac, and N. M. Naumovic. 2005. The Fetus Cannot Exercise Like An Astronaut: Gravity Loading Is Necessary For The Physiological Development During Second Half Of Pregnancy. Medical Hypotheses. 64:221-228
Xavier, M. 1965. Elastane Purchases Accelerate Weight Gain In Case-control Study. Journal of Obesity. 2:23-40.



SPACE-EXES

MATERIALS AND METHODS:

One hundred male and one hundred female Guinea pigs (*Cavia porcellus*) were transported to the International Space Laboratory in 2010. Each pig was housed separately and deprived of exercise wheels and fresh fruits and vegetables for 48 months. Each month, pigs were individually weighed by duct-taping them to an electronic balance sensitive to 0.0001 grams. Back on Earth, an identical cohort was similarly maintained and weighed. Data was analyzed by statistics.

RESULTS:

Mean weight of pigs in space was 0.0000 +/- 0.0002 g. Some individuals weighed less than zero, some more, but these variations were due to reaction to the duct tape, we believe, which caused them to be alarmed push briefly against the force plate in the balance. Individuals on the Earth, the control cohort, gained about 240 g/month ($p = 0.0002$). Males and females gained a similar amount of weight on Earth (no main effect of sex), and size at any point during the study was related to starting size (which was used as a covariate in the ANCOVA). Both Earth and space pigs developed substantial dewlaps (double chins) and were lethargic at the conclusion of the study.



Plant-based production purification and characterization of a catfish therapeutant for promoting fish immune health in the aquaculture system

Lana Elkins^{1,2} and Maureen C. Dolan^{1,3}

¹Molecular BioSciences Graduate Program, ²Department of Biological Sciences, and ³Arkansas Biosciences Institute, Arkansas State University, P.O. Box 635, State University, AR 72467. Contact: mcdolan@astate.edu or elkins@astate.edu



Abstract

As the world population increases and wild caught species decline, aquaculture offers an important sustainable solution in addressing this global challenge. In fact, aquaculture now provides more than half of the world's food fish. With this rapid rise in production, has come the problem of disease management. Current options are limited, and there is a need for innovative solutions. The cytokine interleukin-22 (IL-22) has emerged as a possible therapeutic target for fish and has been associated with protection under pathogen challenge. Plant-based production systems have the potential to effectively manufacture and bring unique efficacy-enhancing features to increase the safety and value of recombinant therapeutics. Importantly, plant production offers advantages of low cost for commodity markets, is readily scalable, and is environmentally friendly. This project focuses on producing catfish IL-22 (cIL-22) as a disease water-water model. Plant-expressed recombinant cIL-22 has been produced on the platform with the goal of administering the biologic orally or immersion to trigger the fish's immune system. IL-22 is known to induce production of natural killer cells and tissue repair proteins and may serve as an alternative to antibiotics or a disease preventative at critical stages in aquaculture production. Here, data is presented on the expression and purification of cIL-22 using the Agrobacterium-mediated transient expression system. Development of an in vitro bioassay, using the channel catfish over cultured cell line and efforts to produce primary cell lines, as well as preliminary protein activity from cell protection and gene expression data is also presented.

Aquaculture: A rapidly growing high value industry

- Farming of aquatic plants and animals
- Provides ~50% of food fish worldwide
- \$119.4 B world wide industry
- Rapid expansion and intensification practices contribute to increased disease.
- Common fish pathogens create devastating unpredictable loss.



- Arkansas is ranked #2 in the U.S. for catfish production.
- Catfish is the #1 cultured species in the U.S. accounting for 60% of farmed fish production.

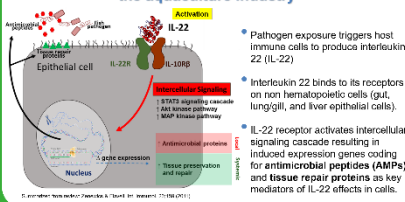
Problem: Few Cost Effective Therapeutics and Vaccines Available with Limited Delivery options



- Current treatment options available in aquaculture: -8 vaccines, 8 drugs
- Associated fish stress, cost, and efficacy are limitations with some of these therapeutic options

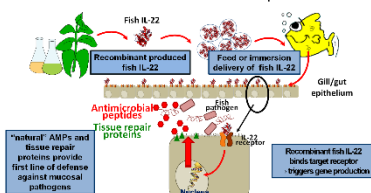
Innovative strategies are needed for disease control and prevention in aquaculture.

Interleukin-22 is a potential therapeutant for the aquaculture industry



Overarching goal of this project

Enhance aquaculture fish health using recombinant plant technology to stimulate the fish's natural immune response



Hypothesis: Plant-expressed fish IL-22, when administered to will stimulate innate immunity providing an effective and environmentally-friendly strategy for improved fish health in the aquaculture setting.

References

Wang, J., et al. 2014. The role of IL-22 in the immune system. *Journal of Immunology*. 193: 1-10.
Sokulic, S.R., D. D. Lukac, and N. M. Naumovic. 2005. The Fetus Cannot Exercise Like An Astronaut: Gravity Loading Is Necessary For The Physiological Development During Second Half Of Pregnancy. *Medical Hypotheses*. 64:221-228
Xavier, M. 1965. Elastane Purchases Accelerate Weight Gain In Case-control Study. *Journal of Obesity*. 2:23-40.

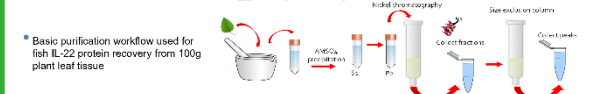
Plant-based expression and characterization of catfish IL-22

Overall cloning and plant expression strategy:

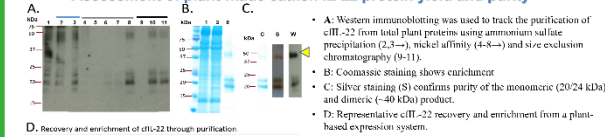


- Sequence for catfish IL-22 (cIL-22) constructed with a his tag was expressed using the Agro-mediated plant infiltration platform

Purification strategy for plant-expressed catfish IL-22



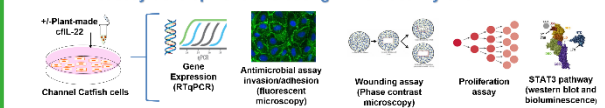
Assessment of plant-made catfish IL-22 protein yield and purity



- Recombinant cIL-22 protein yield
 - ~5.4ug protein/g fresh weight leaf
 - >90% purity (Experion/Coomassie)
 - Potential production for aquaculture 25.5ug/g fresh weight leaf

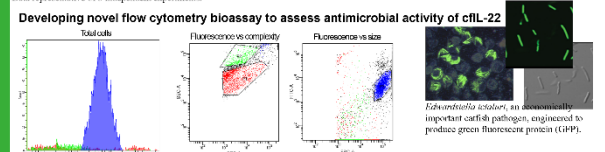
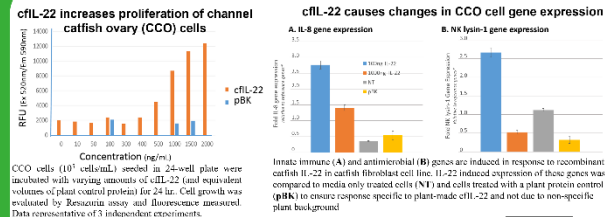
- Both 20 kDa & 22 kDa bands confirmed by MS/MS and N-terminal sequencing to be cIL-22 (monomer).
- Two bands may correspond with differential N-glycosylation or covalent interactions
- MS/MS analysis confirms cIL-22 dimer (yellow arrow).

Bioassay development: evaluating in vitro activity of cIL-22



- A variety of direct and indirect assays are being designed to evaluate the functionality of cIL-22
- Assays are currently being carried out on a cultured cell line with potential to move to primary cultures in the future

Results: cIL-22 activity on channel catfish cultured cell line



Assay development parameters established (shown) for follow on IL-22 studies. Following incubation of bacteria with CCO cells, flow cytometry was carried out to detect association (invasion and/or adhesion) of the bacteria to the cells. Green and red populations correspond to non infected CCO cells, while the blue population is CCO cells infected with GFP expressing bacteria

Bioassay results indicate cIL-22 is active, to be used for upcoming in vivo studies to follow

copyright colin purrington
<http://colinpurrington.com/tips/academic/posterdesign>



- #betterposter Revolution!!



Title:
Subtitle



PRESENTER:
Leeroy Jenkins

BACKGROUND: Who cares? Explain why your study matters in the fastest, most brutal way possible (feel free to add graphics!).

METHODS

1. Collected [what] from [population]
2. Tested it with X process.
3. Illustrate your methods if you can.
4. Try a flowchart!

RESULTS

- Graph/table with **essential results only**.
- All the other correlations in the ammo bar.

Main finding goes here, translated into plain English. Emphasize the important words.



Visualize your findings with an image, graphic, or a key figure.



Take a picture to
download the full paper

AMMO BAR

Delete this and replace it with your...

- Extra Graphs
- Extra Correlation tables
- Extra Figures
- Extra nuance that you're worried about leaving out.
- **Keep it messy!** This section is just for you.

Leeroy Jenkins, author2, author3, author4, author5, author6, author7, author42



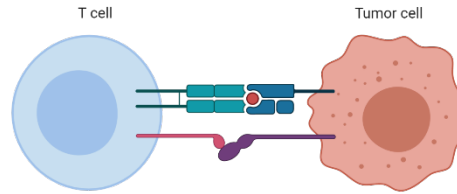
Teach people
something cool you
learned in 5
seconds as they
walk by (or scroll
by).



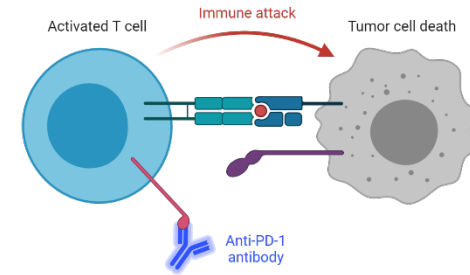
(illustrate your takeaway point)

Method

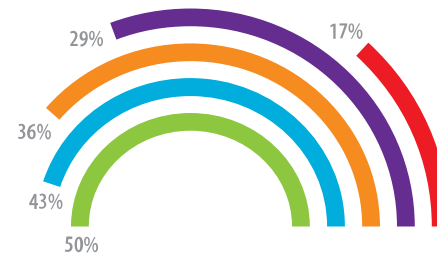
Immune checkpoint **inhibits** T-cell activation.



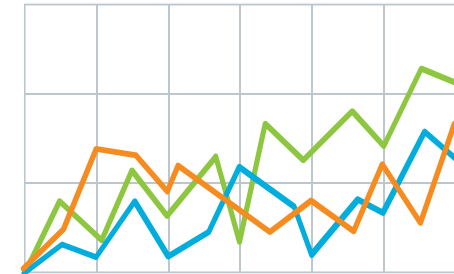
Anti-PD-1 antibodies **permit** T cell activation.



Explain what the graph shows. Like,
spoilers are good.



Quickly explain what the graph shows.
Help people think.



LEM HEWITT, Phillip Merman, Ted crisp
EXAMPLE Graphics donated by biorender.com



PRESENTER

Lem Hewitt

Background

Who cares? Explain why your study matters in the fastest, most brutal way possible (feel free to add graphics!).

Methods

N=564

Adult full-timers

EXPERIMENT GROUP

Given iPod Touch's with a special app that pings them throughout the day with quick surveys.

**Wait list
(CONTROL
GROUP)**

Mood Survey (4x per day)

Participants notified by the iPod at random times to take a short mood survey assessing current mood and attention.

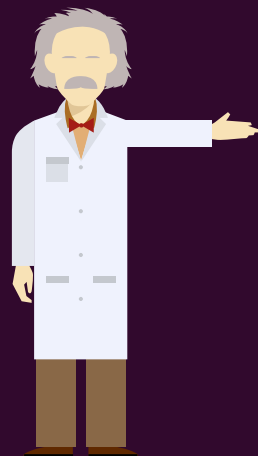
End-of-week Survey
Assessed overall performance for the week.

HLM analysis

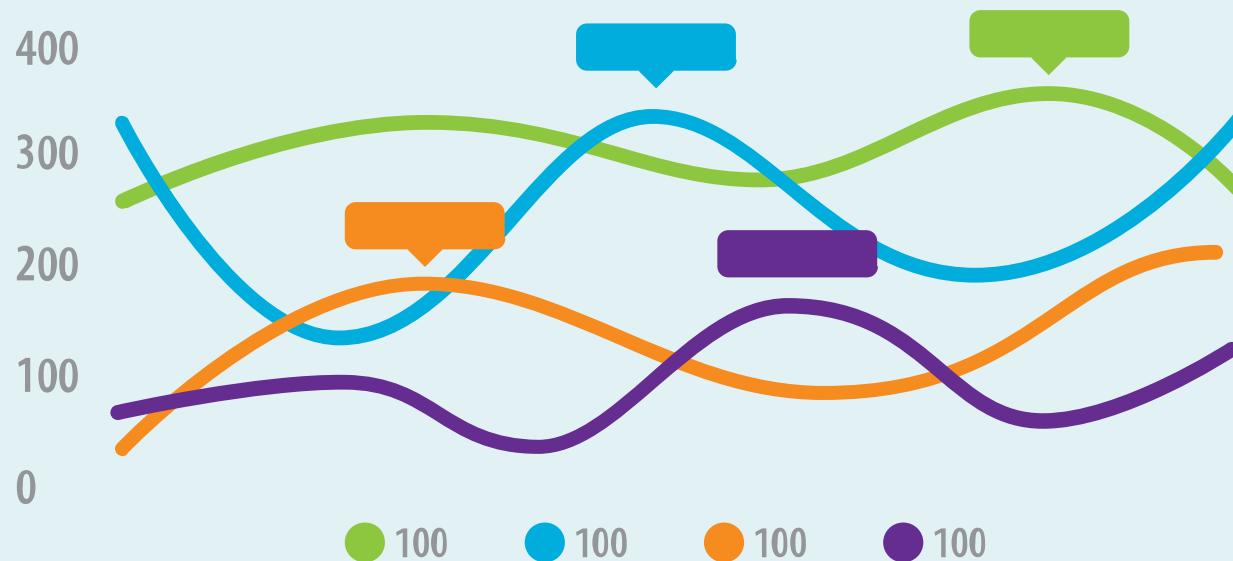
Used to relate within-person mood to differences in performance.

Extra results

Assume they already read your punchline, and now include a little extra detail.

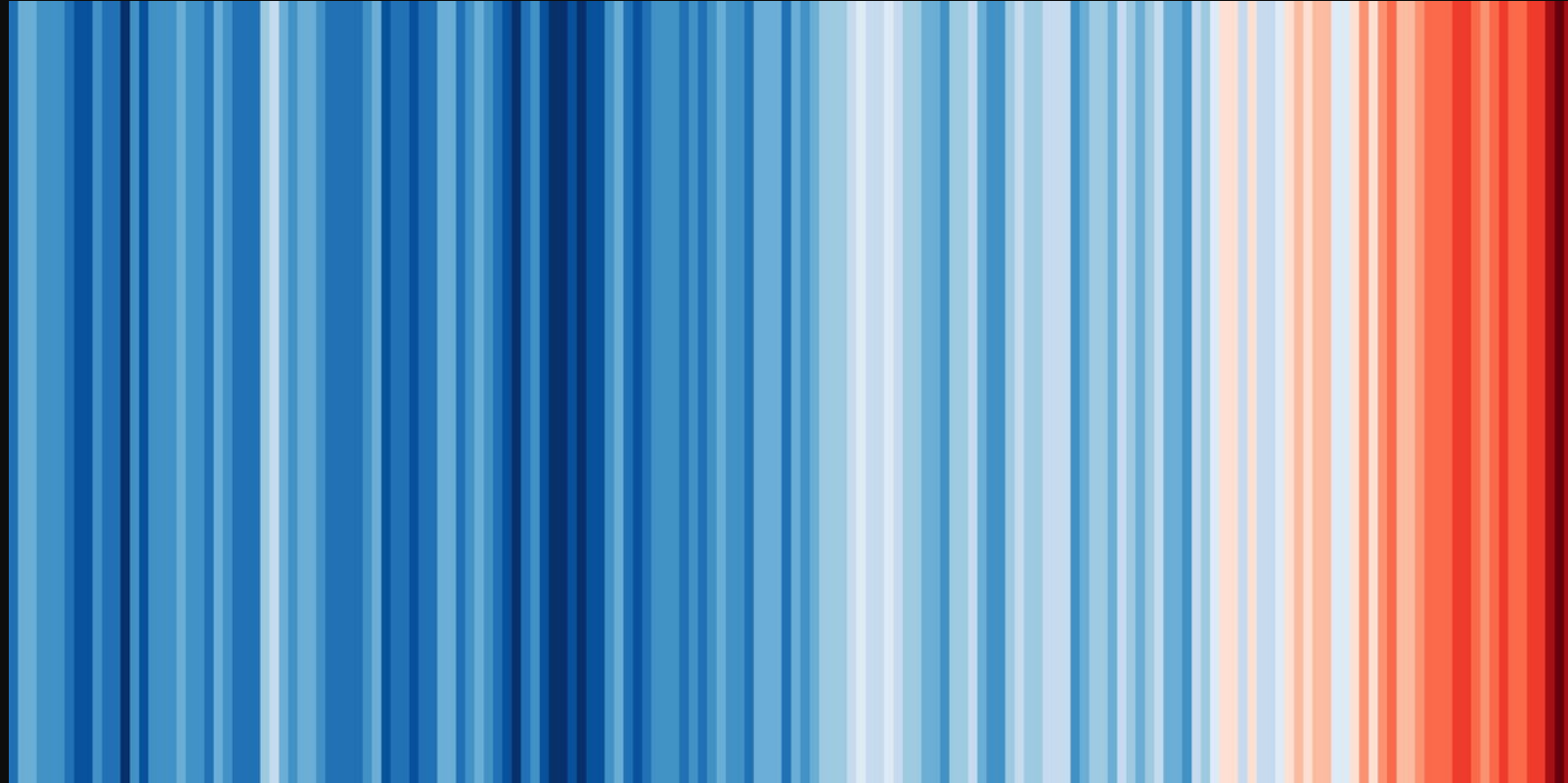


Teach people **something cool you learned** in 5 seconds as they walk by.



LEM HEWITT, Phillip Merman, Ted crisp,
veronica palmer

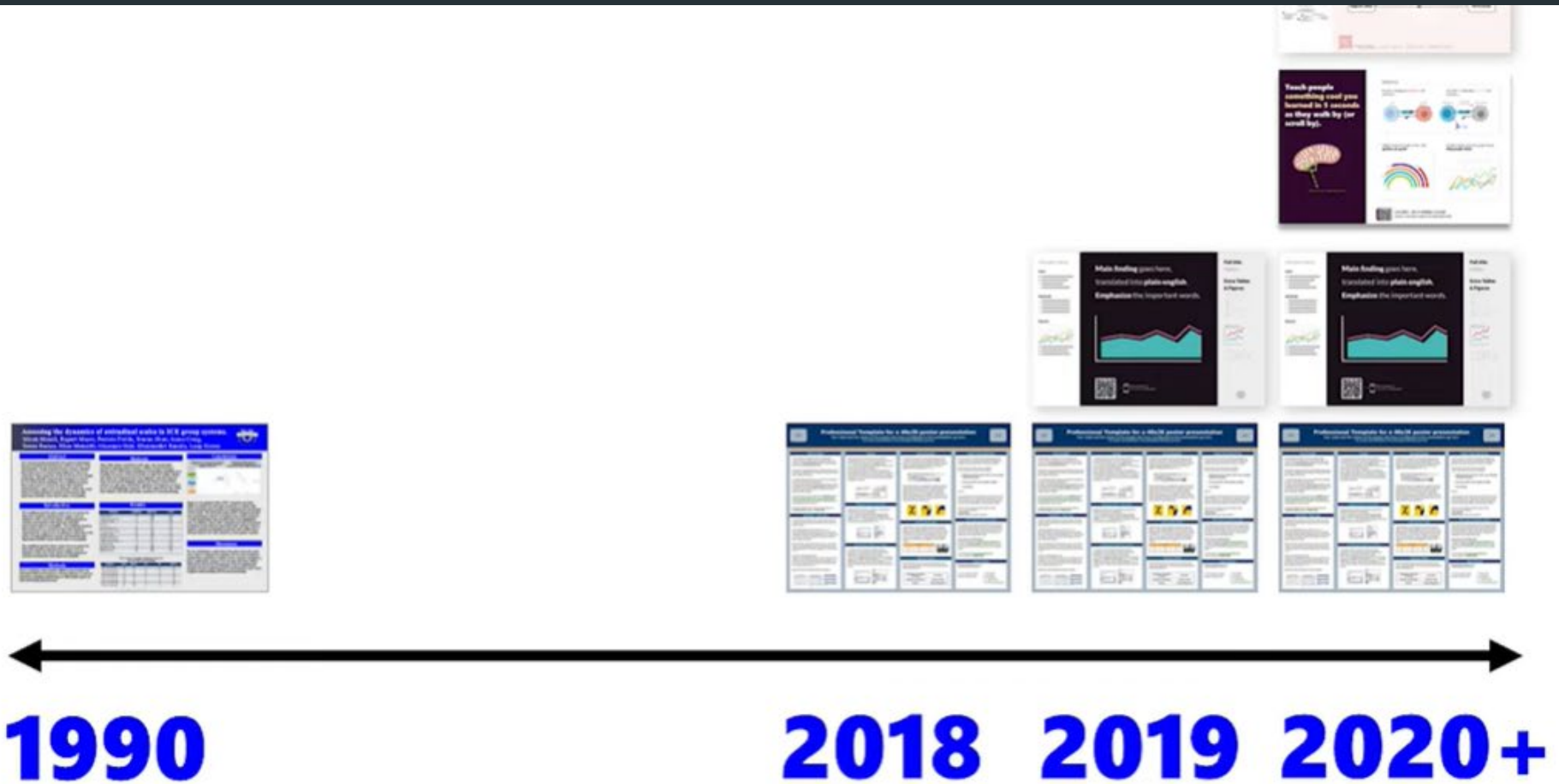
Average global temperature 1850 – 2018



ED HAWKINS
SHOWYOURSTRIPES.INFO



The #betterposter a timeline...



The Latest Research on Scientific Posters | 2024 Update

Latest research on posters: <https://youtu.be/QU8HMU8A3ns?list=TLPQMTYwMzlwMjZ7tmMWVqI-4A>

Move towards hybrid #betterposter

Show-and-tell the best, most insightful part of your methods & data.

Intergenerational transmission of education and ADHD

Effects of parental genotypes

Eveline de Zeeuw
el.de.zeeuw@vu.nl

Elsje van Bergen
e.van.bergen@vu.nl
@drElsje / @NTRscience



Background

It is challenging to study whether children resemble their parents due to nature, nurture, or a mixture of both.

Method

Parents transmit 50% of their alleles to their offspring. The combined trait-specific effect of these alleles are summarized in a polygenic score (PGS). Likewise, we can calculate a PGS for alleles that were not transmitted. They can only affect offspring through the environment, via genetically influenced behaviours in the parents, called *genetic nurturing*. For genotyped mother-father-offspring trios (1,120-2,518 per analysis) we calculated transmitted and non-transmitted PGSs for adult educational attainment (EA) and childhood ADHD, and tested if these predicted and school success and ADHD in offspring.

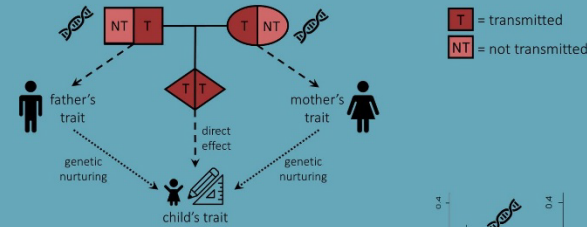
Results

In adults, both transmitted ($R^2 = 7.6\%$) and non-transmitted ($R^2 = 1.7\%$) EA-PGSs predicted offspring EA, evidencing genetic nurturing. In 12-year olds, academic achievement was predicted only by transmitted EA-PGSs ($R^2 = 5.7\%$), but we did not find genetic nurturing ($R^2 \sim 0.1\%$). The ADHD-PGSs did not predict academic achievement ($R^2 \sim 0.6\%$). ADHD symptoms in children were predicted by transmitted EA-PGSs and ADHD-PGSs ($R^2 = 1.2\%$).

Conclusion

Previously reported associations between parent characteristics and offspring outcomes seem to be mainly a marker of genetic effects shared by parents and children. S

Genes of parents shape children's environment, impacting school success in adulthood, but not yet in childhood.



Take a picture to download the full paper

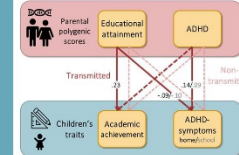
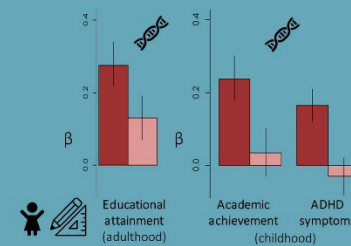
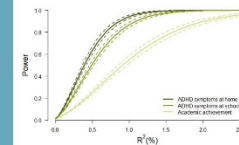


Table 1 The estimated effects (with 95% CI) of the transmitted (T) and non-transmitted (NT) polygenic scores for educational attainment (EA) and ADHD on offspring's academic achievement and ADHD symptoms in later and ADHD symptoms in children.

	Model 1			Model 2		
	Beta	SE	p	Beta	SE	p
Academic achievement (N=1,120)						
EA	2.08 (1.38, 2.7)	0.7	1e10**			
EA	0.04 (-0.01, 0.0)	0.1	.284			
ADHD				-0.77 (1.4, 0.3)	0.6	.022
ADHD				-0.17 (0.08, 0.5)	0.0	.010
ADHD symptoms at home (N=2,518)						
EA	-1.23 (-1.7, -0.8)	0.6	1e10**			
EA	-0.00 (-0.05, 0.0)	0.0	.669			
ADHD				.85 (1.2, 2.1)	0.7	1e10**
ADHD				-0.09 (-0.08, 0.1)	0.1	.390
ADHD symptoms at school (N=1,069)						
EA	-1.31 (-1.88, -0.6)	0.7	1e10**			
EA	-0.02 (-0.06, 0.0)	0.0	.037			
ADHD				1.36 (0.8, 1.9)	0.6	1e10**
ADHD				.09 (-0.10, 0.3)	0.1	.343



Eveline de Zeeuw*, Jouke-Jan Hottenga*, Klaasjan Ouwens, Conor Dolan, Erik Ehl, Gareth Davies, Dorret Boomsma, Elsje van Bergen

* shared-first



Example donated by @drElsje

We Don't Have to Pick a Side: The Middle Is A Fine Place to Be



Andrew R. Smith
Appalachian State University

INTRODUCTION

Mike Morrison created a template for a "Better Scientific Poster" (BSP) (<https://osf.io/ef53g/>)

The BSP format has been praised by many, yet disparaged by others.

The current project had 2 goals:

1. Create a template that I think could be useful.
2. Point out that we don't need to either love or hate the new format—the middle is just fine.

METHOD

To create a new template, I identified strengths of the BSP template and the traditional format.

BSP strengths: clear take-away message, minimal text, QR code

Traditional format strengths: room for figures, reasonable text size on sides, large title to make finding posters in poster session easy, web link and email for people who don't like QR codes

Why must we pick sides?
The new poster format is a revolution, or the new poster format is garbage!

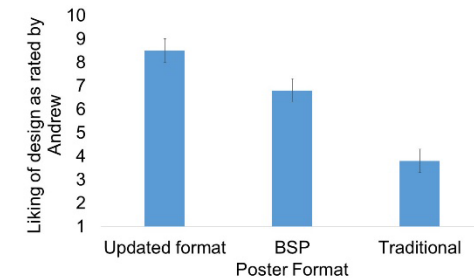
Take the good parts of the new format, keep the useful aspects of the traditional format, add in your own ideas, and create something better.

Poster template: <https://osf.io/ayjzg/>
smithar3@appstate.edu

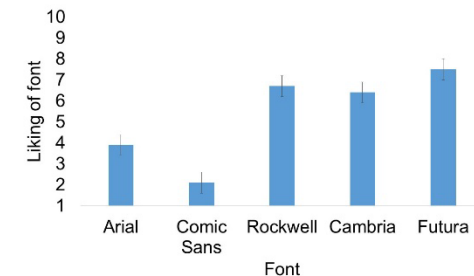


RESULTS

Preregistered analysis: 78% increase in liking compared to traditional format and 24% increase compared to the BSP format



Exploratory analysis: room for improvement in this template (Arial font, seriously?!?!).



DISCUSSION

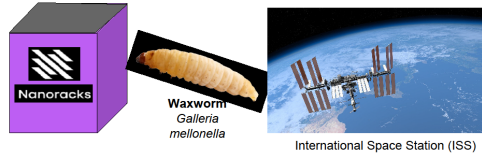
Sometimes it makes sense to pick a side; this is not one of those times.

Praise what you like, make suggestions for improvement, and **then make something better.**

Take Mike's ideas, incorporate some of mine, **be creative**, and let's make posters more useful.

Our Purpose

- Arkansas State SPOCS (Student Payload Opportunity with Citizen Science) was awarded a competitive grant to explore **plastic degradation in microgravity** by the Greater waxworm (*Galleria mellonella*) as a potential waste management solution in space.
- Automated, **student-driven** experiment engineered to run on the International Space Station (ISS) for 45 days (June 2022).



Methods

Biology Team:

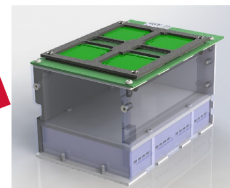
- Established a well controlled research grade waxworm colony
- Tested **temperature, humidity, type of food and crowdedness effects** on plastic consumption and larval lifespan to optimize conditions in microgravity environment.



A-State SPOCS Laboratory-raised Waxworms

Engineering Team:

- Created a **suitable 3D printed habitat** for sustaining an optimal sample size of waxworms in a 10x10x15cm³ box on the ISS
- **Developed several iterations** before arriving at our final module



ISS Waxworm Habitat with Automatic Imaging System

Findings

- Larvae have an **improved consumption and growth rate** in 25-28°C temperature range (temperature on ISS).
- **Environmental stressors** like colder temperatures and increased competition **correlate with greater mortality**.
- Identified and **optimized larvae growth stage** for ISS habitation and plastic degradation experiments

Did you know?

Waxworms can biodegrade plastic on Earth!



Can they do this in space too?

Follow us on social media!



Our Team

- A-State SPOCS team is made up of Honors students majoring in **Biology & Engineering** guided by ABI faculty/staff.
- In addition to the science, all team members actively engaged in mentoring our **4-6th grade citizen scientists**.



Top: Benjamin Whitfield, Katherine Willis, Claire Greene;
Middle: Hannah Seats, Mason Rhodes, Dr. Maureen Dolan;
Bottom: Jacob Oster, Landon Perdue, and R. Shea Harris

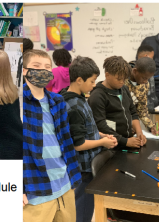
Citizen Science

- Our citizen scientist partners at **Nettleton STEAM** and **Blessed Sacrament Schools** performed **pre-launch biology experiments** to optimize larvae plastic consumption.
- Engaged in engineering activities to understand **project based problems and offer creative solutions**

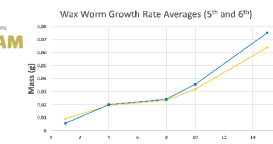
Citizen Science partners collecting Earth-gravity preliminary results



Citizen Science partners successfully growing waxworms in classrooms



Citizen Scientist 5th graders constructing Lego waxworm module for engineering



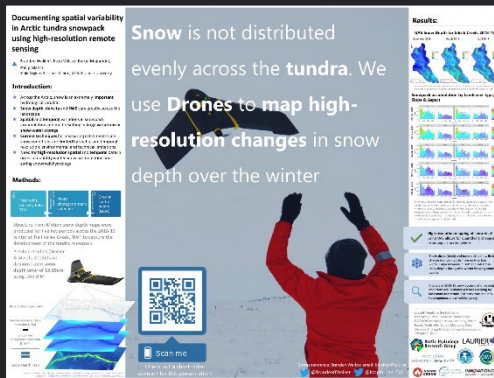
Waxworm growth rates over time collected and calculated by 5th and 6th graders.

Funding and Support:

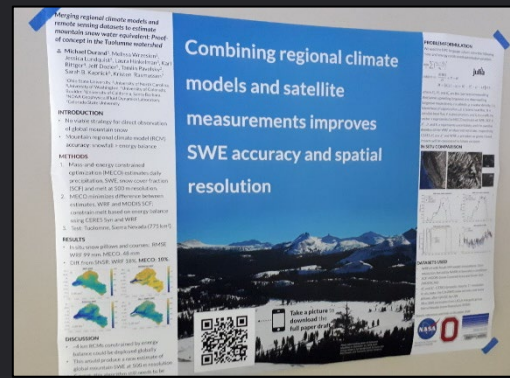


Try an on-theme background

Add fun and reinforce your study's context, but make sure to keep a high contrast between your text and background! ASK ABOUT TONER/COLOR CONSERVATION BEFORE PRINTING.



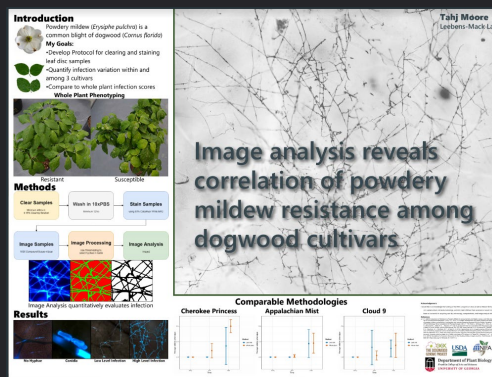
Example donated by
[@brendenWalker](#)



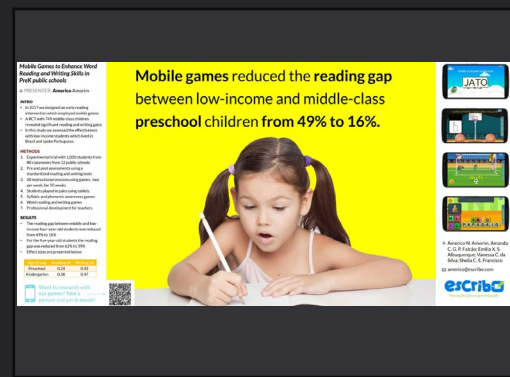
Example donated by [@hydrogawker](#)
Mountain photo by [@mnthydro](#)



Example donated by [@nasaman58](#)



Example donated by
[@SarraceniaMason](#)



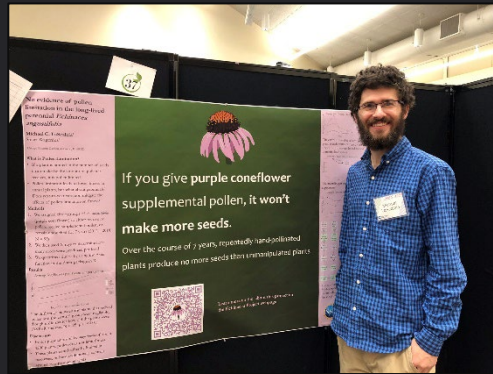
Example donated by [@americoamorim](#)



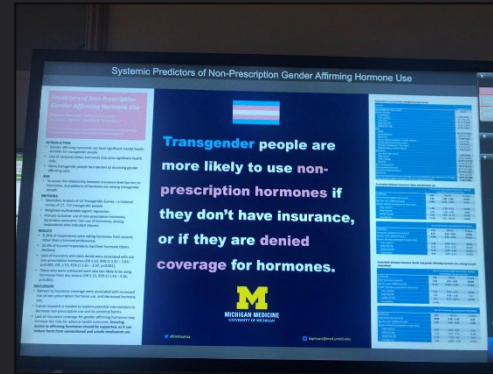
Example by [@mikemorrison](#)

Try a 'hat' icon.

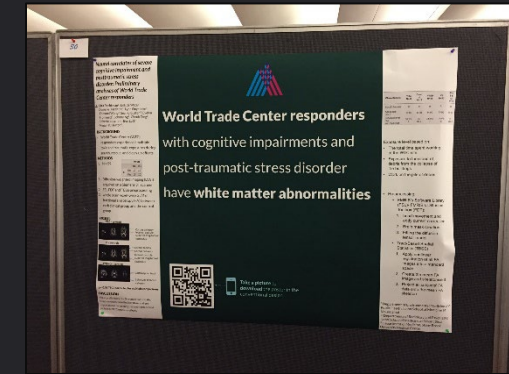
Fun, reinforces your finding, makes your poster memorable — and can be interpreted at-a-glance.



Example donated by
[@MCLaScience](#)



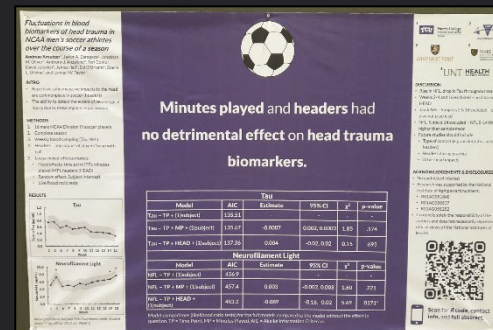
Example donated by [@DStroumsa](#)



Example donated by
[@ElzaRechtman](#)

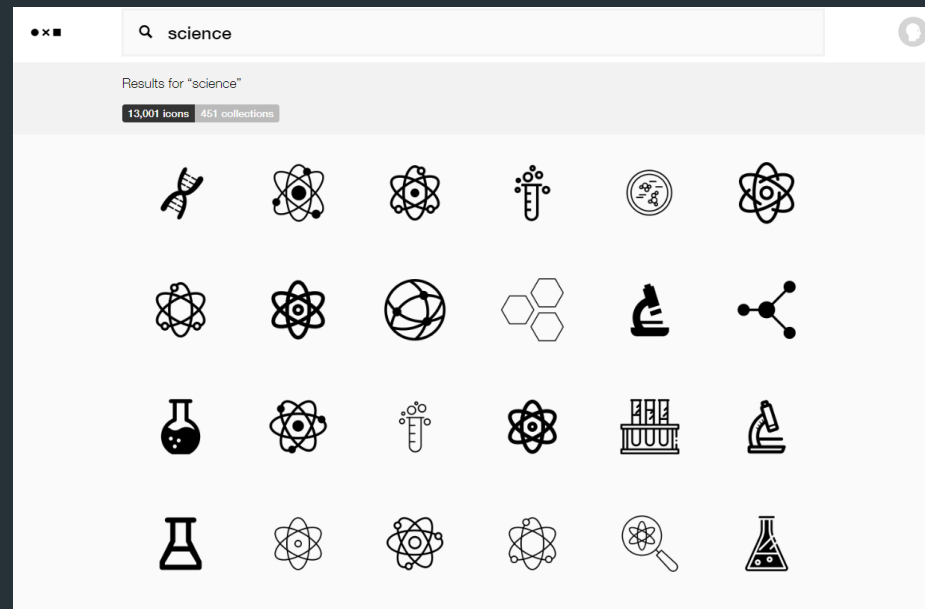


Example donated by
[@mikemorrison](#)



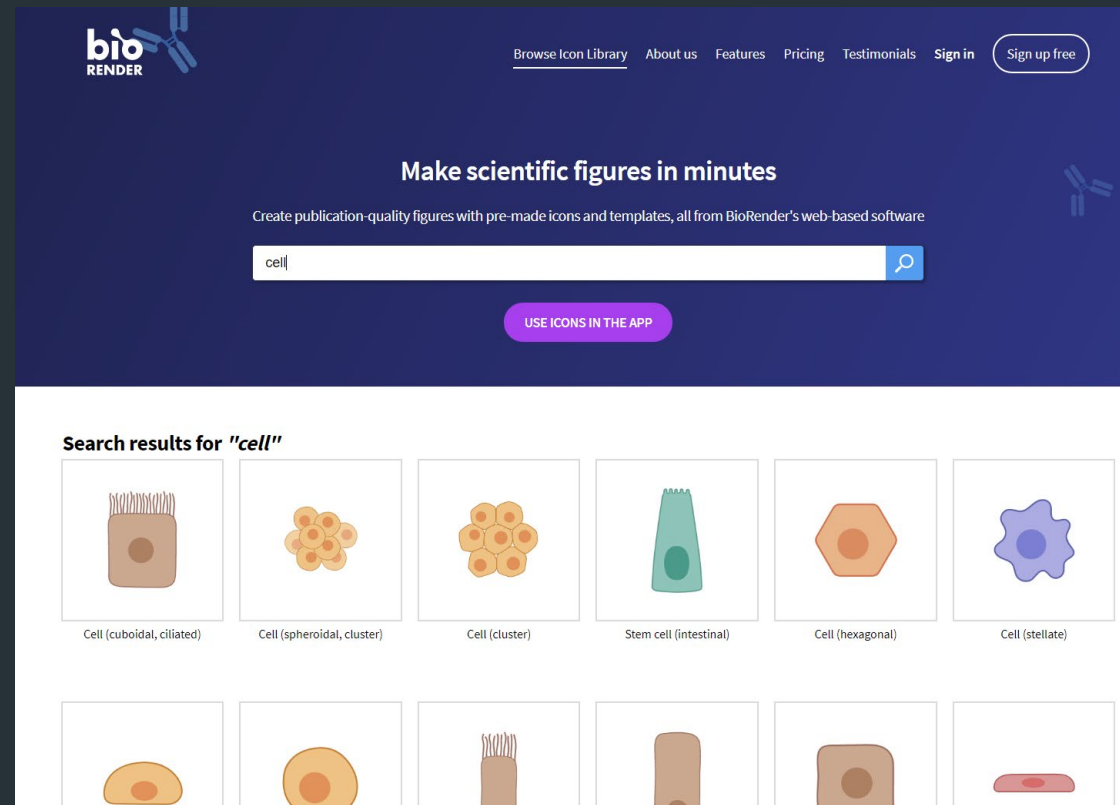
Example donated by [@akreutzer82](#)

You can get free **icons** from
TheNounProject.com



<https://thenounproject.com>

You can create **biology figures** with **BioRender.com**



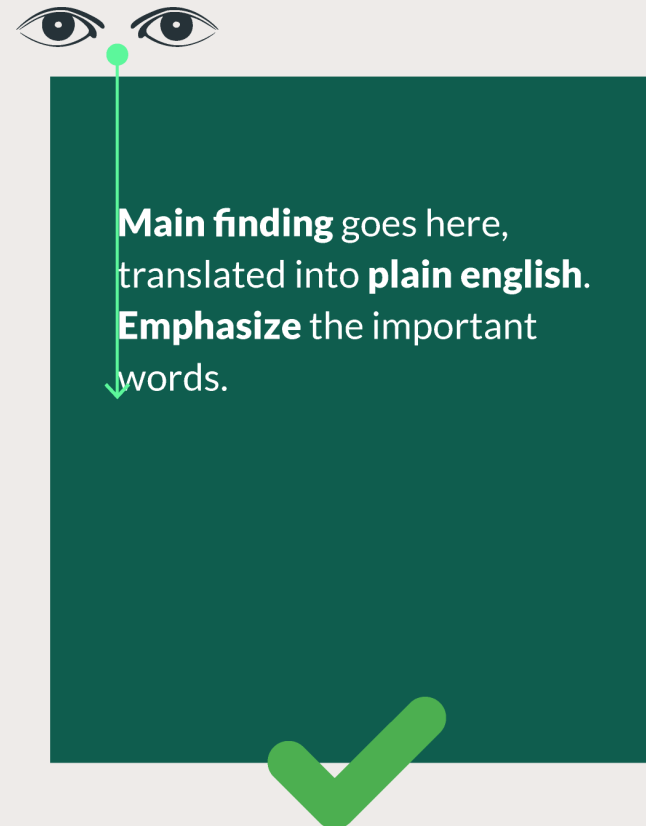
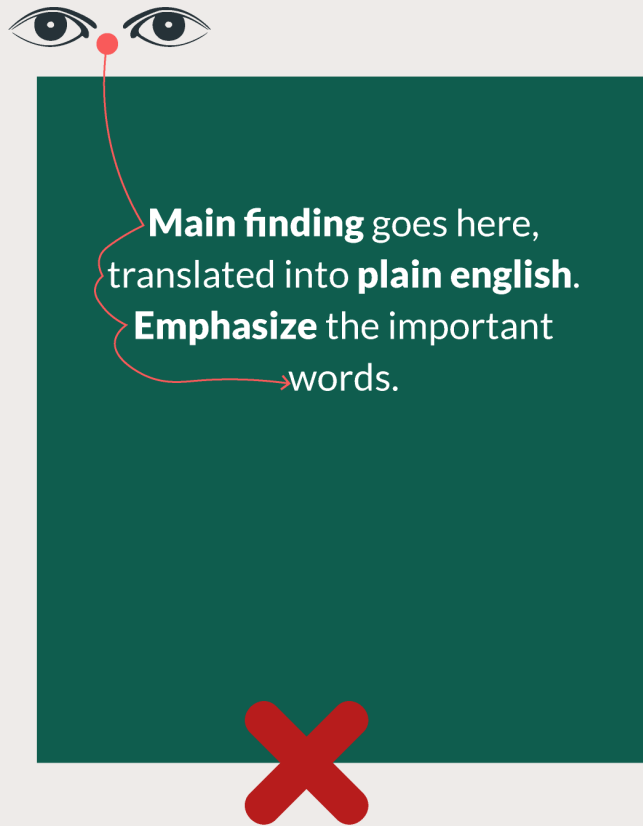
The screenshot displays the BioRender.com website interface. At the top left is the BioRender logo. The top navigation bar includes links for 'Browse Icon Library', 'About us', 'Features', 'Pricing', 'Testimonials', 'Sign in', and a 'Sign up free' button. The main heading reads 'Make scientific figures in minutes', followed by the subtext 'Create publication-quality figures with pre-made icons and templates, all from BioRender's web-based software'. A search bar contains the text 'cell' with a magnifying glass icon. Below the search bar is a purple button labeled 'USE ICONS IN THE APP'. The search results are titled 'Search results for "cell"' and show a grid of 12 biological icons. The first row contains six icons: a cuboidal cell with cilia, a cluster of spherical cells, a cluster of cells, an intestinal stem cell, a hexagonal cell, and a stellate cell. The second row contains six more icons: an oval cell, a spherical cell, a ciliated cell, a columnar cell, a cuboidal cell, and an elongated cell. Each icon is accompanied by a descriptive label.

Search results for "cell"

- Cell (cuboidal, ciliated)
- Cell (spheroidal, cluster)
- Cell (cluster)
- Stem cell (intestinal)
- Cell (hexagonal)
- Cell (stellate)

<http://BioRender.com>

If your punchline is more than 2 lines, don't center it.
Centered text is slower to read than left-aligned text.



#betterposter

[illegible]

by @derektoplasm

Get templates from
<https://derekcrowe.net/butterposter>

The “L” layout

Introduction

Powdery mildew (*Erysiphe pulchra*) is a common blight of dogwood (*Cornus florida*)

My Goals:

- Develop Protocol for clearing and staining leaf disc samples
- Quantify infection variation within and among 3 cultivars
- Compare to whole plant infection scores

Whole Plant Phenotyping

Resistant Susceptible

Methods

```

graph TD
    A[Clear Samples  
8-10% Clearing Solution] --> B[Wash in 10xPBS  
10min, 100°C]
    B --> C[Stain Samples  
using 1% Calcofluor White stain]
    A --> D[Image Samples  
100x Compound Scope x40x]
    D --> E[Image Processing  
using Thresholding and  
Color Thresholding]
    E --> F[Image Analysis  
ImageJ]
  
```

Image Analysis quantitatively evaluates infection

Results

No Hyphae Conidia Low Level Infection High Level Infection

Image analysis reveals correlation of powdery mildew resistance among dogwood cultivars

Tahj Moore
Leebens-Mack Lab

Comparable Methodologies

Cherokee Princess

Appalachian Mist

Cloud 9

Introduction
Powdery mildew is a common blight of dogwood (*Cornus florida*) and is caused by the fungus *Erysiphe pulchra*. The disease is characterized by white, powdery growth on the leaves and stems of the plant. The disease is most common in late summer and early fall. The disease can be managed by using fungicides and by removing infected leaves.

Methods
The methodology described in this paper involves the use of a clearing solution to remove the epidermal cells of the leaf, followed by staining with Calcofluor White. The cleared and stained samples are then imaged using a compound microscope. The images are then processed using ImageJ to quantify the infection.

Results
The results of the study show that the methodology described here is effective in quantifying powdery mildew infection in dogwood cultivars. The study found that the Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Conclusions
The study concludes that the methodology described here is a reliable and effective way to quantify powdery mildew infection in dogwood cultivars. The study also found that the Cherokee Princess cultivar is the most resistant to powdery mildew, while the Cloud 9 cultivar is the most susceptible.

Acknowledgments
The author would like to thank the following people for their assistance in this study: [Names of people who assisted in the study]

References
[List of references]

Figure 1
Figure 1 shows the methodology for clearing and staining leaf disc samples. The process involves clearing the leaf disc with a clearing solution, washing it in 10xPBS, staining it with Calcofluor White, and then imaging it. The resulting images are then processed using ImageJ to quantify the infection.

Figure 2
Figure 2 shows the results of the study. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 3
Figure 3 shows the comparable methodologies for quantifying powdery mildew infection. The Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars are compared using the methodology described in this paper.

Figure 4
Figure 4 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 5
Figure 5 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 6
Figure 6 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 7
Figure 7 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 8
Figure 8 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 9
Figure 9 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 10
Figure 10 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 11
Figure 11 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 12
Figure 12 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 13
Figure 13 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 14
Figure 14 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 15
Figure 15 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 16
Figure 16 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 17
Figure 17 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 18
Figure 18 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 19
Figure 19 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 20
Figure 20 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 21
Figure 21 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 22
Figure 22 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 23
Figure 23 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 24
Figure 24 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 25
Figure 25 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 26
Figure 26 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 27
Figure 27 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 28
Figure 28 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 29
Figure 29 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 30
Figure 30 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The Cherokee Princess cultivar has the highest level of resistance to powdery mildew, followed by the Appalachian Mist cultivar. The Cloud 9 cultivar has the lowest level of resistance to powdery mildew.

Figure 31
Figure 31 shows the results of the study for the Cherokee Princess, Appalachian Mist, and Cloud 9 cultivars. The



by @SarraceniaMason

Adobe InDesign templates here:
<https://osf.io/zkmvw/>

#betterposter Take home messages

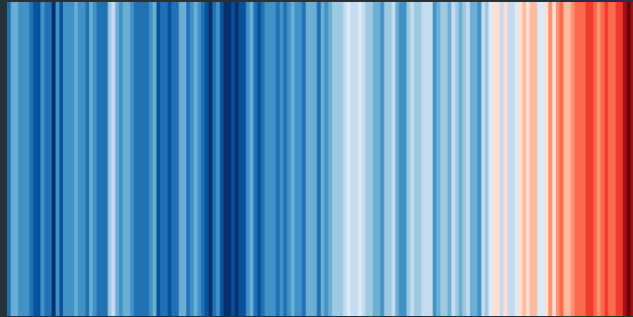
Great design is **subtle**.

Designers feel a surge of happiness when they get to **delete** something.

When it looks too simple to represent the amount of time you put into it, **you're done**.

The **main message** was effectively delivered.

UX and Psychology



We Don't Have to Pick a Side: The Middle Is A Fine Place to Be

Appalachian
STATE UNIVERSITY

Andrew R. Smith
Appalachian State University

INTRODUCTION

Mike Morrison created a template for a "Better Scientific Poster" (BSP) (<https://osf.io/ef53g/>)

The BSP format has been praised by many, yet disparaged by others.

The current project had 2 goals:

1. Create a template that I think could be useful.
2. Point out that we don't need to either love or hate the new format—the middle is just fine.

METHOD

To create a new template, I identified strengths of the BSP template and the traditional format.

BSP strengths: clear take-away message, minimal text, QR code

Traditional format strengths: room for figures, reasonable text size on sides, large title to make finding posters in poster session easy, web link and email for people who don't like QR codes

Why must we pick sides?

The new poster format is a revolution, or the new poster format is garbage!

Take the **good parts** of the new format, keep the **useful aspects** of the traditional format, add in your own ideas, and **create something better.**

Poster template: <https://osf.io/ajy3g/>
smithar3@appstate.edu

RESULTS

Preregistered analysis: 78% increase in liking compared to traditional format and 24% increase compared to the BSP format

Exploratory analysis: room for improvement in this template (Arial font, seriously?!?)

DISCUSSION

Sometimes it makes sense to pick a side; this is not one of those times.

Praise what you like, make suggestions for improvement, and then make something better.

Take Mike's ideas, incorporate some of mine, be creative, and let's make posters more useful.

“Hybrid”

ALL ARE BETTER

Plastic Biodegradation in Microgravity; An A-State and K-12 Partnership Aboard the International Space Station

A-State NASA SPOCS Team | ARKANSAS STATE UNIVERSITY | JONESBORO, AR

Our Purpose

Arkansas State SPOCS (Student Payload Opportunity with Citizen Science) was awarded a competitive grant to explore plastic degradation in microgravity by the Greater waxworm (*Galleria mellonella*) as a potential waste management solution in space.

Automated, student-driven experiment engineered to run on the International Space Station (ISS) for 45 days (June 2022).

Methods

Biology Team:

- Established a well-controlled research-grade waxworm colony
- Tested temperature, humidity, type of food and crowding effects on plastic consumption and larval lifespan to optimize conditions in microgravity environment

Engineering Team:

- Created a suitable 3D printed habitat for sustaining an optimal sample size of waxworms in a 10x10x5cm box on the ISS
- Developed several iterations before arriving at our final module

Findings

- Larvae have an improved consumption and growth rate in 25-28°C temperature range (temperature on ISS)
- Environmental stressors like colder temperatures and increased competition correlate with greater mortality
- Identified and optimized larvae growth stage for ISS habitation and plastic degradation experiments

Did you know?

Waxworms can biodegrade plastic on Earth!

Can they do this in space too?

Follow us on social media!

- @astatespocs
- ASpaceSpocs
- @ASpaceSPOCS

Our Team

A-State SPOCS team is made up of Honors students majoring in Biology & Engineering guided by ASU faculty staff.

In addition to the science, all team members actively engaged in mentoring our 4-6th grade citizen scientists.

Citizen Science

Our citizen scientist partners at Nettleton STEAM and Blessed Sacrament Schools performed pre-launch biology experiments to optimize larvae plastic consumption.

Engaged in engineering activities to understand project based problems and offer creative solutions

Citizen science partners collecting Earthgravity petri dish results

Citizen science partners successfully growing waxworms in classrooms

Citizen Scientist 5th graders connecting class waxworm rearing for engineering

Waxworm growth rates over time estimated by 5th and 6th graders

Funding and Support:

“Real-life”

ABSTRACT:

The purpose of this study was to determine the effect of zero gravity and vacuum conditions on the growth and survival of the larvae of the greater wax moth (*Galleria mellonella*) in a vacuum chamber. The study was conducted in a vacuum chamber at a pressure of 0.001 mmHg. The results showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber for up to 14 days. The study also showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber at a pressure of 0.001 mmHg for up to 14 days.

INTRODUCTION:

The purpose of this study was to determine the effect of zero gravity and vacuum conditions on the growth and survival of the larvae of the greater wax moth (*Galleria mellonella*) in a vacuum chamber. The study was conducted in a vacuum chamber at a pressure of 0.001 mmHg. The results showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber for up to 14 days. The study also showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber at a pressure of 0.001 mmHg for up to 14 days.

MATERIALS AND METHODS:

The study was conducted in a vacuum chamber at a pressure of 0.001 mmHg. The results showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber for up to 14 days. The study also showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber at a pressure of 0.001 mmHg for up to 14 days.

RESULTS:

The results showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber for up to 14 days. The study also showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber at a pressure of 0.001 mmHg for up to 14 days.

CONCLUSIONS:

The study showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber for up to 14 days. The study also showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber at a pressure of 0.001 mmHg for up to 14 days.

ACKNOWLEDGEMENTS:

The study was conducted in a vacuum chamber at a pressure of 0.001 mmHg. The results showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber for up to 14 days. The study also showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber at a pressure of 0.001 mmHg for up to 14 days.

LITERATURE CITED:

The study was conducted in a vacuum chamber at a pressure of 0.001 mmHg. The results showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber for up to 14 days. The study also showed that the larvae of the greater wax moth were able to survive and grow in a vacuum chamber at a pressure of 0.001 mmHg for up to 14 days.

“Word Wall”

Thanks for participating in this poster making session!



Feel free to contact us if you have specific questions!

Mr. Shea Harris rsharris@astate.edu

Dr. Maureen Dolan mdolan@astate.edu