Preparing for
Undergraduate Research Day

Rebecca Alexander on behalf of
the URECA Center committee
This is one of the best days of the year!
October 27, 2017
3 – 5 p.m.
Family Weekend
Exactly 3 months away
Talks
Poster session
Oral presentations

Only ~10-12, typically more humanities projects
- In two different rooms
- Running at the same time as poster session
- 8-10 minute talks, including questions

Works well if you have a story to tell
Audience is smaller
Okay to use slides or just talk
Best when it’s not reading a paper
Most students will do posters (~120 of these!)
Great way to present images, data, charts
Needs more pre-planning
Bigger audience
Presentation is easier
How to make a poster

Just use PowerPoint!
Format for 36X36” – one big slide
Template available on ureca.wfu.edu

1. Design

2. Slide size

3. Custom size
URECA will pay!

Convert your .pptx to .pdf to make sure nothing changes.
Send to copies.wfu.edu
Subject line “to print for Research Day”
Include your name in the file “Alexander_poster.pdf”
We’ll pay for one 36X36 poster
How to make a GOOD poster

Lots of suggestions at http://colinpurrington.com/tips/poster-design

Key points:
Pictures >>> Words
Use color without being too cute
Font large enough to read from 3 ft away
  Title = 60-72 pt
  Headings = 40+ pt
  Text = 36 pt
  Figure legends, citations = 24 pt
Identifying Pre-Columbian Housefloor Dimensions through Lithic Analysis at the Redtail Site (31Yd173)

Maya Krause – Anthropology, Biology Minor

**Introduction**

This archaeological research analyzes the spatial distribution of lithic remains in an attempt to identify the dimensions of a housefloor at the Lake hardwood Province Native American Settlement Site, dating to about 1500. The Redtail site (31Yd173) provides archeologists with a unique opportunity to gain a better understanding of prehistoric settlement patterns and cultural practices.

Ongoing excavations at Redtail have revealed a potential housefloor, related artifacts, and several pit features. Previous results show that ceramic size and concentration in interior areas increases. The site contains a maintained surface with repeated human activity. This pattern generally indicates the existence of a housefloor. The identification of housefloor dimensions would provide valuable details concerning housefloor size, density, and artifact frequency. This will help improve our understanding of settlement patterns and the daily life of prehistoric inhabitants.

**Site History**

In the heart of the American Southeast, the Late Woodland Period begins ca. 1500 A.D. and continues to ca. 1650 A.D. The Redtail Village Tradition (RVT) refers to a culture that developed in the upper Tuscaloosa River Valley. Most people had been living in scattered settlements, usually consisting of a single household. The Redtail site (31Yd173), identified by S. E. Jones in 1985, is an example of a well-developed and well-maintained site. The RVT culture is characterized by a high degree of specialization in the production of lithic artifacts, such as arrowheads, spear points, and knives. The site includes a variety of artifacts, including stone tools, pottery, and bone artifacts, indicating a complex culture with diverse trade networks and social interactions.

**Methods**

The research is based on an analysis of three excavation blocks of continuous units (Units A, B, and C). This research sample represents 20% of the total housefloor area and 40% of the total activity area. Lithic artifacts were collected from these units, including ceramic sherds, bone fragments, and metal artifacts. A total of 38 artifacts were identified from this sample, including 20 ceramic sherds, 10 bone fragments, and 8 metal artifacts.

**Results & Interpretations**

The research indicates that the housefloor area is located in the interior area, with a concentration of lithic artifacts. The potential housefloor size was determined by analyzing the distribution of artifacts. The potential housefloor area contained 95.2% of the total housefloor area, with a potential housefloor area of 1.5 x 1.5 meters. The potential housefloor area was compared to other features, such as the activity area and the general area.

**Acknowledgments**

This research was made possible by Dr. S. E. Jones and the Anthropological Geographic and Analytical Laboratories of Wake Forest University, Wake Forest University Anthropology Department, and the University of North Carolina at Greensboro. The authors would like to thank the residents and communities of the North Carolina Piedmont for their support and assistance.
Aminotransferase activity of a novel AARS appended domain
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Program 4751.3
Aminotransferase synthetases (AARS) are key enzymes in protein biosynthesis, responsible for transferring amino acids to the 3' end of tRNA molecules. The AARS are modular proteins, with separate polypeptide domains responsible for specific binding and catalysis. Additional domains on some AARS contribute to optimization, localization, and editing functions, the opportunistic pathogen Methicillin-resistant Staphylococcus aureus (MRSA) is heavily virulent due to its tight control on methionine biosynthesis. However, expression of the N-terminal appended domain of MmMetRS catalyze aminotransferase activity.

Mycoplasma penetrans
- Bacteria of class Mollicutes
- Opportunistic human pathogen
- Colonizes urogenital and respiratory tracts of immunocompromised individuals
- Small (1.3 Mbp A+T-rich genome)

Methionyl-tRNA synthetase
- Essential for protein biosynthesis
- Catalyzes methionine activation and transfer to tRNA<sub>Met</sub>
- Exhibits great structural diversity through evolution:
- A common core with varied appended domains

- Catalytic core
  - A. aerius
  - E. coli
  - C. elegans
  - H. sapiens
  - S. cerevisiae
  - M. penetrans

- What is the role of extra protein domains in MmMetRS?
- Why does a parasitic organism with a condensed genome have an extra long MetRS?

Appended domain is homologous to Class V PLP-dependent aminotransferases

Which α-keto acids and amino acids are In vitro substrates? Is methionine a substrate or a product?

Are the catalytic activities of the domains independent or coupled?
- Aminotransferase domain: Lys 386 is key PLP binding residue
- Synthetase domain: Acp 616 is key AIP binding residue

What are the preferred substrates?
- Next steps: In vivo experiments
  - Hypothetical: the aminotransferase domain is generating methionine

Mutation to aminotransferase domain impacts tRNA aminocacylation

Does the N-terminal appended domain of MmMetRS catalyze aminotransferase activity?
Here’s a BAD poster

Pigs in Space: Effect of Zero Gravity and Ad Libitum Feeding on Weight Gain in Cavia Porcellus

Colin B. Purrington
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ABSTRACT:
One ignored benefit of space travel is the potential elimination of obesity, a chronic problem for a growing majority in many parts of the world. In fact, when an individual is in a condition of zero gravity, weight is reduced. Instead of eating more food, one could excrete more fat. In fact, studies show that ad libitum feeding and relatively greater consumption of fat and carbohydrate led to significant weight loss when an individual was in a condition of zero gravity. This is a plausible explanation for the decrease in obesity rates observed in countries that have adopted space travel technologies. In conclusion, these findings suggest that space travel may offer a promising solution to the global obesity epidemic.

INTRODUCTION:
The current obesity epidemic started in the early 1980s with the invention and proliferation of fast food and related obesity factors. In 1965, an experiment was conducted in which pigs were placed in a zero-gravity environment. The pigs showed an initial increase in weight, but eventually their weight stabilized, and they remained at this weight for the duration of the experiment. This experiment was later repeated, and similar results were obtained. In conclusion, these findings suggest that zero-gravity conditions may have a positive impact on weight management.

RESULTS:
Mean weight of pigs in space was 0.0003 ± 0.0002 g. Some individuals weighed less, but none of them gained weight. However, these variations were due to reaction to the duct tape, which caused them to be strained, push their faces against the force plate in the balance. Individuals on Earth, the control cohort, gained about 240 g/month (p = 0.0022). Males and females gained a similar amount of weight on Earth (no main effect of sex), and pigs at any point during the study were resistant in the front end, which was used as a control in the古今社. Both Earth and space pigs developed substantial growth (double chin) and were lethargic at the conclusion of the study.

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 results 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 8 years, pending expected review by local and federal IRBs.

LITERATURE CITED:

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http://colinpurrington.com/tips/academic/posterdesign
Practice a 3-minute version of your project
Show enthusiasm
Get to the punch line – what did you learn?
Make sure you can answer questions if people are interested
Only put things on your poster you can explain
“Business casual” dress
• Pants and polo or button-up for men
• Skirt or pants for women
• Don’t need to wear a suit
• Comfortable shoes! 😊

Don’t chew gum
Hands out of pockets
Look people in the eye
Have fun!
How to talk about your
summer experience
Job interview
Grad/Med/etc school interview
Meeting with your academic advisor
Cocktail party with your future in-laws
What to think about

How to use the experience to tell about yourself

How did you grow?
What skills did you develop?
What are you prepared to do now?
The project itself might be peripheral
For a “Behavioral Interview”

Situation/Task

Action

Result
Use the STAR method to answer

What was the most difficult task you performed during your summer project?
Next steps

Keep working on your project
Consider an honors thesis
Follow us on Twitter @WFU_URECA
Sign up for Handshake, LinkedIn
Come to
   Career Fair: September 13
   Graduate and Professional School Fair: November 9
Undergraduate Research Day October 27th
Abstract will be due 2 weeks ahead