Moodle at UMass Amherst

Turn editing on

HONORS391AH-SEC10 Honors Seminar 2 - Topics Spring 2019

Announcements

Syllabus

Class e-mail list

Pre-Columbian cultures of the Andes

Overview of the course and the syllabus. Basic chronology and distinguished features of pre-Columbian cultures of the Andes. How to talk about mathematics in the context of non-Western cultures? Complex relationship between mathematics, art, technology and education.

Lecture Slides

Cosmology and material culture of the Andes

Art of the Andes was shaped by a unique environment. Read about its main features and learn some useful terminology.

An excerpt from the "Art of the Andes" by Rebecca Stone

Art of the Andes (the same excerpt from UMass library)

Andean worldview Forum

Choose one of the Andean worldview notions discussed in class (one student per topic) and upload a picture from the internet (either pre-Columbian art or modern photograph) that illustrates the concept. Explain why. Then choose a different topic (at most two students per topic) and discuss how it could have shaped mathematical or technological advances in the Andes. Due on Sunday at 11pm

Lecture Slides

Funerary Mantles of Paracas

Reading brief on Paracas culture (excerpts from *Art of the Andes* by Rebecca Stone and *Pre-hispanic cultures of Peru* by Justo Macedo).

A zoomable Paracas mantle (Linear Style)
A zoomable Paracas mantle (Block Color Style)
Paracas mantle in the Boston MFA
Paracas mantle in the Brooklyn museum

Unwrapping a funerary mantle - a pretty animation

Extra material: Unwrapping a funerary mantle - a documentary in Spanish

 Exploring Paracas mantles Forum

Choose one of the mantles and discuss the following topics:

Describe the style (Linear or Block Color)

In which museum is it located (if known)

Geometric, mathematical features (organizational principle) of the mantle (provide diagram or illustration if necessary)

What does this mantle symbolize? Does it tell a story?

Do not repeat what other students are saying. Instead provide more details, insights, corrections, etc.

 Lecture Slides

17 plane symmetry groups

This week we will discuss *symmetry analysis,* which allows us to classify (some) patter
in art and nature according to their symmetries.

My favorite place to learn about crystallographic groups is <u>Tohsuke Urabe
Laboratory</u>. He explains math very well and applies symmetry analysis to traditional
Japanese wallpaper patterns. After learning different types of patterns you can even
take a <u>quiz on his website</u>, which I highly recommend.

A shorter but not as thorough explanation is available on <u>this website</u>.

Once you have learned the basics, and took a quiz on Urabe's website, go to the foru
and try to classify a given photo using IUC notation.

Your groups for this forum will be called Symmetry 1, Symmetry 2, ... , Symmetry 5.

Explain your reasoning. Are different interpretations possible? Do you think symmet
analysis is a reasonable tool for understanding this pattern

In class we will also discuss two remaining Paracas mantles (2 and 4)

<u>Classify a pattern Forum</u>

Symmetry analysis

I have posted my comments and suggestions for the previous Forum. There was some disagreement between students about classification
This forum is reopened - please post your corrections (reply to the main thread where the pictures were posted)

The attached paper, *SYMMETRY GROUPS IN THE ALHAMBRA,* demonstrates that all 17 crystallographic groups are represented in the arabic til
of the Spanish palace of the Alhambra.

For the next Forum, pick one of the threads (maximum of two students per thread - you can claim the thread in a short post before your m
post) and completely analyze it as following a template from the Alhambra paper (including diagrams)

<u>SYMMETRY GROUPS IN THE ALHAMBRA</u>

<u>Symmetry analysis of pre-columbian textiles Forum</u>

<u>Lecture Slides</u>

Wari tunics

We will discuss the paper *The Mythic Geometry of the Ancient Southern Sierra by* William Conklin. Note: illustrations quoted throughout the te
are all at the end and some of them are in the second attached file.

<u>A zoomable Wari tunic</u>
<u>Another zoomable Wari tunic</u>
<u>A zoomable Wari hat</u>

<u>William Conklin's paper</u>

📄 and additional pictures from it

📄 Vanishing point vs. Vanishing line Forum

William Conklin argues that Wari tunics contain images of (spiritual or real) geography "woven" in the special type of mathematical perspective, which has the vanishing line (the horizon) but not the vanishing point. The idea is neatly summarized in the last illustration of the paper.

How would familiar paintings of the western canon look in the Wari perspective without the vanishing point?

Convert one of the following pictures into Wari perspective without a vanishing point and upload it here. Part of the assignment is to figure out your own way of doing this visual distortion: you can use any software, apps, print-project-photograph or simply draw it yourself.

https://artsandculture.google.com/asset/interior-of-the-pantheon-rome/1AHJFNF8OkfG9Q

https://artsandculture.google.com/asset/the-golden-bend-in-the-herengracht-seen-from-the-east/zAHdhYvpFXV66Q

https://artsandculture.google.com/asset/saint-jerome-in-his-study/CwHA2ZMWYLelOw

https://artsandculture.google.com/asset/interior-of-a-church/awE7Yy99eyW9wg

https://artsandculture.google.com/asset/the-piazza-san-marco-in-venice/ngEjiEaEofpMEg

https://artsandculture.google.com/asset/architectural-veduta/kAGQtjZedrY6Xw

left third of https://artsandculture.google.com/asset/valance-with-scenes-from-the-life-of-christ/aAHPke6ioYePeg

https://artsandculture.google.com/asset/perspective-map-of-fort-worth-tex-1891/OAHvcr9niWDYug

https://artsandculture.google.com/asset/the-staircase-of-the-london-residence-of-the-painter/uAHdsJn_8e-zIQ

https://artsandculture.google.com/asset/lady-at-the-virginal-with-a-gentleman-the-music-lesson/CwFxCw3kUr-Lrw

https://artsandculture.google.com/asset/the-ideal-city/8wFKYPd4faLPlw

📄 Lecture notes

Weaving on the back-strap loom

We will learn how to weave on the Andean backstrap loom. To prepare, watch this basic weaving video by Laverne Waddington.

Weaving, Hand (by Anni Albers)

Description of group projects

Choice of a group presenttion

Please choose one of the four group projects on the first come, first served basis.

Please note that Project A has a limit of four students and other projects have a limit of three students

Available until **March 25 2019, 11:00 AM**

Two designs for today's class

Weaving geometric patterns

Weaving terminology, weaving notation, specifics of creating patterns on the woven plane, genesis of modern Quechua weaving patterns

Designing your own one-dimensional pattern

(1) Choose one of the seven 1-dimensional patterns and create your own design based on that on squared paper. Post a photo of the design.

(2) Weave it on the backstrap loom and post a photo of the result.

You can repeat (1) and (2) as many times as you like, especially if the first attempt was not very successful.

(3) Reflect on **mathematical** difficulties of creating patterns for the backstrap loom with complementary warps.

(4) Comment on another student's reflections.

A documentary about Quechua people

Lecture notes

Abstractions of fabric structures

Continuation of discussion of weaving patterns. Mary Frame papers on fabric structures in Andean designs.

The Visual Images of Fabric Structures in Ancient Peruvian Art, by Mary Frame

Elemental pathways in Fiber Structures, by Mary Frame

Lecture Slides

pixeLoom software we used in class

Fractals in pre-Columbian textiles

We will discuss Mary Frame papers (30 minutes) and applications of fractal geometry to pre-Columbian textile patterns (20 minutes)

Analysis of Mary Frame's approach

Group A: read "The Visual Images of Fabric structures"

Group B: read "Elemental pathways"

Contribute 500 words (one or two posts) discussing some of the following topics:

1) What is the main thesis?

2) Following Frame, explain the genesis of one of the geometric patterns on Andean fabrics.

3) Is this thesis well supported by evidence?

4) Any examples of fabric structures from the previous lectures or readings.

5) What is the role of serpents?

6) How does the author explain abundance of helicoidal (cork-screw) motives?

7) What are the S and Z twists?

8) How is Frame's approach different from "crystallographic groups" approach to patterns?

Weaving draft for the Kuti design

What is the minimal number of shafts necessary to weave the Kuti design (see the lecture slides for weaving designs) on the modern loom automatically in the warp-faced mode? Give the weaving draft (see the last lecture notes) for it. Either sketch it on squared paper and scan or use software like pixeLoom and make a screenshot of the result.

Terminology Quiz (multiple-choice)

The quiz contains many pictures, make sure that you have good internet connection before you start.

There are 13 questions, each question is worth 8 points.

Lecture slides

Statistical analysis of khipu (April 17) and field trip (April 19)

Class on April 17 (Monday schedule): Statistical analysis of khipu

What is a khipu

Overall structure

Knots and numbers

Field Trip on April 19:

(1) Please forward an excuse letter to your professors.

(2) We will leave from UMass Fine Arts Center at 7AM on Friday so that we can be back on campus as early as possible, most likely between 2PM and 3PM (depending on traffic). Let me know if you live off-campus - we may be able to pick you up on the way. My department will provide sandwiches for lunch from UMass catering, let me know your choice.

(3) Depending on time when we arrive at the Peabody museum, we will either begin by exploring a selection of pre-Columbian textiles in th classroom or move to storage for a discussion of preservation of objects. Alternatively, we may start with storage and then move to object Please be advised that food and drink are not allowed in storage or in their classroom. Additionally, they don't allow bags in storage, but th are cubbies to leave personal items outside the classroom. Any notes should be taken on pencil and paper or on phones. They do not allow pens or laptops. After our work in storage, we will visit museum halls open to the public to observe Moche and Nasca ceramics on view.

Excuse letter

Description of the R package

Statistical analysis of khipu

Student presentations: groups A and B

Reflections on the field trip Forum   10 unread posts

Choose several textile pieces observed in the Peabody Museum and reflect on their imagery, technique, and geometric structures (500 words)
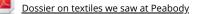
Deadline: April 24 (students in groups C & D

May 1 (students in groups A & B)

Photos from the field trip

Photos of Nasca artefacts (mostly ceramics)

Photos of Moche artefacts (mostly ceramics)

Dossier on textiles we saw at Peabody

Slides of student presentation A

Slides of student presentation B

Student presentations: groups C and D

Final essay

The final essay (7 pages double-spaced) will explore in-depth some of the topics raised in your group presentation. It should be prepared individually.

Symmetry in Development (by Diane Humphrey) - screenshots

Symmetry in Development (Diane Humphrey) on Google Books

[PDF] Slides of student presentation C

[PDF] Slides of student presentation D