

ZOOM access

NASE-Virtual

Saturday, October 8" 12:00 to 14:00hs (UTC)



## <u>Timeline NASE +</u> ROADMAPS 2022

#### 2022, October 8th



## Timeline NASE + ROADMAPS 2022

- Opening session Beatriz García, Margarita Metaxa & Rosa M. Ros, Argentina, Greece, Spain.
- "Mongolia and Silk Road", Tsolmon Rechin, National University of Mongolia, Ulaanbaatar, Mongolia
- "Chartaquis in the Silk Road", Hosein Khezri, ITAU, Bushehr, Iran.
- "The use of the stars during Odysseus' sea voyage after the fall of Trioy in 1218 B.C.", Stavros Papamarinopoulos, University of Patras, Greece.



## Timeline NASE + ROADMAPS 2022

- "The ancient relation in Spain between the Milky Way and the St. James Way", José Ángel Docobo, Santiago University, Santiago de Compostela, Spain.
- Summary of "Determining Latitudes in Viladecans", Shila Sia, Philippines Normal University, Manila, Philippines and Paula Chis, George Baritiu School, Cluj, Romania.
- "Elcano. The greatest adventure of the history", Antonio A. Pazos García, Real Instituto y Observatorio de la Armada, S. Fernando Cadiz, Spain.



## Timeline NASE + ROADMAPS 2022

- "Treaty of Tordesillas: the Iberian context", Sofia Condessa, Associação de Professores de História, Porto, Portugal.
- "The meso-american pecked cross as a calendar device: an example of long-distance migration knowlegde", Rodrigo Esparza López, Centro de Estudios Arqueológicos, Michoacán, Mexico.
- "What happened to the north? the Kogi constructions of the Sierra Nevada de Santa Marta", Mauricio Giraldo, Museo de Bogotá, Colombia.
- Closing session Beatriz García, Margarita Metaxa & Rosa M. Ros, Argentina, Greece, Spain.





#### Seminaries NASE+ ROADMAPS 2022

Saturday, October 8<sup>th</sup> 12:00 to 14:00hs (UTC)

# APS 2022

Zoom access

NASE-Virtual

## In 2022, NASE+ program, proposes to return to the origins!!

#### ROADMAPS 2022

#### Inviting everyone:

- to learn and understand how historic long-scale Journeys or Travels were accomplished through astronavigation
- to learn how to navigate using the stars!!



.. Odyseus' sea voyage .. Silk road ..st. James road ..Colombus Journeys .. Magellan & Elcano

Journey

## 100 Hours of Astronomy 1-4 October 2022





Universiteit Leiden

OHoursOfAstronomy #IAUoutreach

## **MONGOLIA and SILK ROAD**

Tsolmon Renchin Ph.D National University of Mongolia, Mongolia Rosa Maria Ros NASE Spain

> Seminaries NASE+, Roadmaps 8 October, 2022 Barcelona, Spain

## Mongolia



Language: Mongolian

Area: 1.56 million sq km

**Population:** 3 million



**Government:** parliamentary

Land boundaries : 8,114 km

**Border countries:** China 4,673 km, Russia 3,441km

## Latitude for travelling and navigate NASE

In 2022 NASE program proposes to return to its origins, inviting everyone to participate in the project "silk road" and navigate its latitudes

NASE and Silk ROAD

NASE is initiating activity to make measurements of Latitude for traveling and navigating.

link: http://sac.csic.es/astrosecundaria/en/Presentacion.php

## **NASE project activity in MONGOLIA**



















## Latitude for travelling and navigate in Mongolia











#### **UNESCO project in BARCELONA** 7 October, 2022







## **Routes of the Silk road**



From Seleucia, routes passed eastward over the Zagros Mountains to the cities of Ecbatana (Iran) and Merv (Turkmenistan), from which additional routes traversed to modern-day Afghanistan and eastward into Mongolia and China.Mesopotamian city in modern-day Iraq.

Silk Road routes also led to ports on the Persian Gulf, where goods were then transported up the Tigris and Euphrates rivers.

#### Silk Road



- The silk road was a network of paths connecting civilizations in the East and West since 1,400 years. Merchants on the silk road transported goods and traded at bazaars or caravanserai along the way.
- Served as a vehicle for the fruitful exchange of arts, religion, cultures, ideas and technology enabling caravans to exchange tangible goods

https://www.deccanherald.com/content/533037/internet-silk-road-decade.html

## Silk Road





The Silk Road routes also opened up means of passage for explorers seeking to better understand the culture and geography of the Far East.

Venetian explorer Marco Polo famously used the Silk Road to travel from Italy to China, which was then under the control of the Mongolian Empire, where they arrived in 1275.

#### The influence of Mongolia on the development of the Silk Road



The Mongol Empire played a significant role and influence in the history of the Silk Roads.

The Mongolian empire dates to the 13th and 14th centuries, having reached its highest peak in expansion.

• This massive geographical reach allowed the Empire to offer the Silk Roads more secure and organized trade throughout its land. This allowed the land routes to flourish.

#### The influence of Mongolia on the development of the Silk Road



Kublai Khan made foreign traders exempt from taxation .As a result of this important political and security role, the Mongols were heavily engaged in the Silk Roads network.

The Mongols not only provided the frameworks for intercontinental exchange, but they facilitated and acted as active agents.

## **Khar-Khorin is main city of the Silk Road**

One of the most important cities in the history of the Silk Road was Karakorum (Qara-qorum; *Mong*.: Khara-Khorin). 'founded' under Chingis Khan in 1220



link: https://guyuk.mn/

#### Archaeological evidence :

Karakorum was commercial and cultural interactions across Eurasia in which the Mongols played such an important role. The exchange of thoughts, ideas, and beliefs as a result of the Silk Roads.



link: https://guyuk.mn/

## **Positive Outcomes of the Silk Road Network**

Included beneficial focus for:

- The environment
- How learning about each other's culture a sense of global citizenship
- The familiarity with the night sky can motivate greater participation from young people
- To develop interdisciplinary subjects such as traditional science, cultural, and mental exchange

## **Positive Outcomes of the Silk Road Network**

There are still happening activities for Silk Road in Mongolia.

Silk Road for tourism nomadic culture and tourism opportunities along the world's renowned Silk Road, develop a new tourism brand product, and raise awareness of the necessity.

To conserve and protect nomadic heritage.

Conservation and protection of the environmental, historical, and cultural heritage of Silk Road nations.

link:<u>https://en.unesco.org/silkroad/content/international-silk-road-conference</u> -nomadic-tourism-and-sustainable-cities)

## **Nomads civilization**





As a nomad nation, the Mongols have thousands of years of history and experience of raising livestock. The number of nomads has significantly decreased over the last years.





## **Follow up activities**

There is need to plant trees and protect Gobi unique environment ASTRO-ECOLOGY













The desert zone of Mongolia is the northern edge of the Central Asian Desert.

Silk road passed in this area





 In this way, joining Astro-tourism and ecological renewal, we can use astronomy for ecology. To plant trees in a semi desert area is one of the main activities for astro-ecology in Mongolia.

#### **Astronomy activity in Silk Road activity**



- To develop Astronomy and Ecology in the GOBI (SILK ROAD network)
- Mongolia invites you to come for ASTRO-ECOLOGY Adventures.
   By daytime we will plant trees and by night we will be immersed in the beautiful and awe inspiring night skies of the Gobi.
- To re-green the Gobi and stop desertification.

# Gracias por su atención



#### The Silk Road and Čahār-Tāqīes

Hosein Khezri, Maryam Papari and Parham Eisvandi Iranian Teacher's Astronomy Union ITAU, Iran

## THE SILK ROAD

THE SILK ROAD WAS A NETWORK OF TRADE ROUTES CONNECTED TO THE EAST AND WEST OF THE ASIAN CONTINENT IT CONNECTED SOUTH ASIA TO NORTH AFRICA AND EASTERN EUROPE. THIS WAY FROM TUAN HUANG COUNTY IN CHINA TO THE PROVINCE OF KANSU CAME FROM THERE AND ENTERED TODAY'S EASTERN TURKESTAN AND PASSED THROUGH BISHBALIGH, ALMALIGH AND ATRAR TO IT REACHED SAMARKAND AND BUKHARA. IN BUKHARA, THE MAIN PART OF IT CAME TO RAY THROUGH MERV, SARKHS, NEISHABUR, GORGAN, AND FROM RAY TO IT WENT TO QAZVIN, ZANJAN, TABRIZ, AND YEREVAN, AND FROM YEREVAN IT WOULD LEAD TO TRABUZAN OR BIKI FROM THE PORTS OF SYRIA.



# THE COMBINATION OF A ROAD, A CASTLE AND A ČAHĀR-TĀQĪES IN THE SASANIAN PERIOD:

The beginning of the Sassanid period coincided with the invention of dome construction in Iran; A dome that was structurally different from similar Roman ones.

The first dome that identified the Sassanid style of architecture is located in Fars Province. However, the Sassanid dome that stood on four arches.

Among all the architectural works of this period, four-arched buildings are known as the symbol of the Sassanids, despite the diversity of the four-arched forms, their main structure is very similar throughout the country.

## **INTRODUCTION TO ČAHĀR-TĀQĪES**

ČAHĀR-TĀQĪES IS ONE OF THE BASIC FORMS IN IRANIAN ARCHITECTURE, WHICH IS USED IN MANY BUILDINGS FROM THE SASSANID ERA .

LACK OF METHODICAL INFORMATION IN THIS REGARD, RESTORATION MEASURES, ARCHEOLOGICAL EXCAVATIONS AND SITE ORGANIZATION IT AFFECTS THE HISTORICAL BUILDING IN A NEGATIVE WAY. IN ADDITION TO RELIGIOUS USAGE, TO OTHER USES THAT CAN BE IMAGINED FOR SASSANID ČAHĀR-TĀQĪES ARE DISCUSSED; APPLICATIONS SUCH AS BEING A SIGN OF A GUIDE OR LIKE A SOLAR STRUCTURE.

#### THE STRUCTURAL PATTERN OF ČAHĀR-TĀQĪES :

If the dome is placed on a cylindrical space, it can be integrated with the body of the building. An example of this kind of dome can be seen in the Roman Pantheon (Figure 1).

But in dome construction on the cubic space, the main problem is how to convert the cubic space below into the circle of the dome.



Figure 1. Pantheon Temple-Dome on a cylinder

#### THE STRUCTURAL PATTERN OF ČAHĀR-TĀQĪES :

In Iran's pre-Islamic architecture, filpoosh and seh-konj are used to convert a square into a circle dome (Figure 2).



Figure 2. The image of the dome covering the cube-shaped space

#### CLASSIFICATION OF ČAHĀR-TĀQĪES

There are functional models about the Čahār-Tāqīes, which are: •
A) Signs: signs on the road that are built on the highways and are visible.
B) Observatories: astronomical building, solar observatory
to recognize the days of the year and to determine the exact day
In this research, we have examined the calendar use of the Čahār-Tāqīes and then we analyze this structure by drawing the plan and checking the sunrise and sunset angles.



Figure 3. Čahār-Tāqīes of Jareh - Baladeh - Kazeroon city - Fars province — Iran Location: 29.297224457236133N , 51.96010402003014E
### **RELATIONS:**

By examining the geographical location of Jareh-Baladeh Char-Tagi in Kazerun city (Fars province), we find that the sunrise and sunset interval is not 23.5 degrees and this interval reaches about 30 degrees. seem to indicate the arc described by the Sun on the Eastern horizon from the Summer and Winter solstices rises: In the pictures, we have shown the relationship between latitude and sunrise degrees.

Latitude L	X°
0°	23,5°
10°	24°
20°	25°
30°	27°
40°	32°
50°	40°
60°	53°

### **CONCLUSION:**

BY COMBINING THE SCIENCE OF ARCHITECTURAL ENGINEERING AND ASTRONOMY, WE WERE ABLE TO FIND OUT THAT BY DRAWING THE PLAN OF A HISTORICAL WORK AND ASTRONOMICAL STUDIES, ACCORDING TO THE SUNRISE AND SUNSET ON THE IMPORTANT DAYS OF THE YEAR (SOLSTICES AND EQUINOXES), A CALENDAR USAGE FOR THIS BUILDING CAN BE DETERMINED. THE FACT THAT OUR ANCESTORS PAID A LOT OF ATTENTION TO THE RISING AND SETTING OF THE MOON, STARS AND THE SUN AND THEY USED THIS ISSUE IN THE CONSTRUCTION OF TEMPLES, PLACES OF PRAYER AND STRATEGIC MILITARY CENTERS.

IN FACT, THE ČAHĀR-TĀQĪES WERE USED AS A ROUTE GUIDE AND SOLAR CALENDAR IN THE SASSANID PERIOD, WHICH WAS ONE OF ITS APPLICATIONS ON THE SILK ROAD.

Figure 4. Plan **Čahār-Tāqīes** of Jareh - Baladeh -Kazeroon city –Fars ProvinceFigure3.**Čahār-Tāqīes** of Jareh - Baladeh - Kazeroon city - Fars province – Iran Location: 29.297224457236133N, 51.96010402003014E



Odysseus sailing with the stars NASE's Event-8.10.2022 Prof. Dr. Stavros P. Papamarinopoulos University of Patras **EMAEM** Greece

Odysseus left Troy, after its fall, in 1218 and ten years later returned to his *Penelope* in 1207 BC The dates are strictly astronomical



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### A NEW ASTRONOMICAL DATING OF ODYSSEUS' RETURN TO ITHACA

St. P. Papamarinopoulos<sup>1</sup>, P. Preka-Papadema<sup>2</sup>, P. Antonopoulos<sup>3\*</sup>, H. Mitropetrou<sup>1</sup>, A.Tsironi<sup>1</sup> and P. Mitropetros<sup>2</sup>

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#### A NEW ASTRONOMICAL DATING OF THE TROJAN WAR'S END

#### Papamarinopoulos S.<sup>1</sup>, Preka-Papadema P.<sup>2</sup>, Mitropetros P.<sup>3</sup>, Antonopoulos P.<sup>4</sup>, Mitropetrou E.<sup>3</sup>, Saranditis G.<sup>5</sup>

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Byron, Athens, Greece

Years BC 10 War years in Troy and 10 years of Odysseus' absence No common calendar First War Year 1227-1226 **1218**-1217 Tenth War Year From Spring to Spring 1208-1207 **Twentieth Year** 

## Homer in Od.5.272-274

as he watched the Pleiades, and late-setting Boötes, and the Bear, which men also call the Wain, which ever circles where it is and watches Orion



## The **Bear**, always is visible circling in the sky. She is waiting in anxiety her 'hunter' Orion to appear.

### The Bear is watching for Orion to arrive. Gibraltar 1207 BC (1<sup>st</sup> of October 20.00 LT)





# And indeed Orion, her hunter, appears later at 22.30 LT.

Orion's delay in appearing in the horizon in the company of the Great Arctos (Ursa Mayor), Pleiades and Boötes in order to be added as a separate astronomical event can be observed everywhere on the planet within the latitudinal width of the Mediterranean Sea.

# Pleiades move eastwest and **Boötes** north-west to north-east.

## The constellations are observed all night in the latitudinal width of the Mediterranean Sea.

## But these exact constellations could be observed in the same latitudinal width in the Atlantic cean too.

However, **Boötes'** β and γ constellations are not visible all night north of England's southern edge. Meaning that Odysseus was not sailing northwards of that latitude!

It is challenging enough to ask ourselves where was Calypso's location when she gave Odysseus in 1207 BC such a correct astronomical advice?

**Odysseus** is sailing, having to his left Ursa Major, as Calypso, told him. The latter means, west to east, geographic direction!

Homer: Od.5.272-274 Οψέ δύοντα Βοώτην It means, that the slowly moving to set Boötes, never sets completely all night in 1207 BC.

Palermo 1207 BC LT **10th** of October (A) at 19.00 (B) at 21.00 (C) at 23.00 **11th** of October (D) at 01.00 (E) at 03.00 (F) at 05.00 'Slowly setting Boötes' but its stars Nekkar and Seginus, do not set at all **Boötes** to rise starts again remaining all visible above the horizon all night.



Boötes, in our days, does not behave as it was described by Homer in 1207 BC. This means that the exceptional fossilized astronomical information, locked, in the Odyssey for eternity was proved correct thanks to the modern software tools we have such as Starry Night.

Palaeolithic and Mesolithic Sailors in the Aegean and the Near East

Adamantios Sampson

And prehistoric **Greek mariners** utilized astronomy in the Mediterranean Sea, in the Black Sea, in the European Rivers and in the **Atlantic Ocean** 

The prehistoric Greeks as Argonauts, with Peleus, Achilles' father, were sailing towards northern latitudes. They conquered Troy for first time. A generation later Troy was fallen second time in 1218 BC later by the children of the Argonauts such as Achilles for instance.



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#### THE ARGONAUTICA ORPHICA VERSION FOR THE VOYAGE OF THE ARGONAUTS: A GEO-ANALYSIS

Kalachanis, K.<sup>1</sup>, Preka-Papadema, P.<sup>2</sup>, Kostikas, I.<sup>3</sup>, Theodossiou, E.<sup>2</sup>, Manimanis, V.N.<sup>4</sup>, Panou, E.<sup>5</sup>, Rotolo, S.G.<sup>6</sup>, Kyriakopoulos, K.<sup>7</sup>

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#### ASTRONOMICAL AND MATHEMATICAL KNOWLEDGE AND CALENDARS DURING THE EARLY HELLADIC ERA IN AEGEAN "FRYING PAN" VESSELS

#### M. Tsikritsis<sup>1</sup>, X. Moussas<sup>1</sup>, D. Tsikritsis<sup>2</sup>

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Received: 18/08/2014 Accepted: 18/12/2014

Corresponding author: X.Moussas (xmoussas@phys.uoa.gr)

The oldest portable astronomical and calendrical calculating devise was constructed in the Neolithic Period 6500 years ago in the Aegean Sea.



FRYING PAN VESSELS FOUND IN GREECE FORTH AND THIRD MILLENIUM BC

### Venus' definition of its Synodic Period



### Portable calculating astronomical and calendrical device based on Venus' Synodic period







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#### A MINOAN ECLIPSE CALCULATOR

#### M. Tsikritsis\*,1 E. Theodossiou2, V.N. Manimanis2, P. Mantarakis3, D. Tsikritsis4

<sup>1</sup> Directorate of Secondary Education, Department of Informatics and New Technologies, Heraklion 71202, Herak-lion, Crete, Greece (mtsikritsis@gmail.com)
<sup>2</sup> Department of Astrophysics, Astronomy and Mechanics, Faculty of Physics, National & Kapodistrian University of Athens, Zographon 157 84, Greece (etheodos@phys.uoa.gr)
<sup>3</sup> 22127 Needles St, Chatsworth, California, USA
<sup>4</sup> Institute of Electronic Structure and Laser, Foundation for Research and Technology -Hellas, N. Plastira 100 Vassilika Vouton, GR-700 13 Heraklion, Crete, Greece.

Received: 17/6/2012 Accepted: 20/9/2012

Corresponding author; E. Theodossiou (etheodos@phys.uoa.gr)

### The portable prehistoric mechanism of Palaecastro from Crete



O Jan Velsink showed that the Mechanism of Palaekastro is much older meaning that the prehistoric Cretans were able to sail with this portable instrument utilizing knowledge from the stars 400 years earlier.

#### # A & E S C H Annual Fagers on Mediterra

#### BABESCH

Annual Papers on Mediterranean Archneology

#### About BABESCH

BARSON densely indictor iterative flow naring) is a permitteneed provide all pathibilities arrangly lines in increhence in 1920. Use of the main objectives of this established journal is to provide a lower for archaeologists where research and fieldwork treas on Medimourism Archaeologist, Read movie.

6 Conclusion(\*Jan Velsink - Bulletin Antieke Beschaving (BABesch) For stylistic and iconographical reasons Palaikastro-moulds 1 and 2, which were mainly intended for the manufacture of small cult objects, should be dated to the Middle Bronze Age, to MM II or MM III (ca. 1875/50-1700/1675 BC). These moulds are, in fact, related to Middle Minoan moulds for casting implements. This revised date confirms that the iconographical type of the 'goddess with uplifted hands' (nowadays mostly called 'goddess with upraised arms') was already depicted in the Middle Minoan period. Moreover, this redating has received an unexpected complement from a quite independent angle. At the very time that the present author was considering it, Minas Tsikritsis of the Department of Informatics and New Technologies in Herakleion had been examining the motifs in great detail (visible in high-definition photos: see Tsikritsis et al. 2013) and had concluded that the moulds were for creating portable astronomic calculators for use by travellers. Minoan travelling for purposes such as trade and embassies was thriving and growing in MM II-III, not in LM IIIC. Rather than providing 'tantalizing evidence of religious importance continuing' until LM IIIC or later. the moulds belong to a time when Crete was entering upon its highest flowering.

# From the Palaecastro 18<sup>th</sup> century to the Antikythera mechanism 2<sub>ed</sub> century BC

Vol 444 30 November 2006 doi:10.1038/nature05357

### LETTERS

nature

#### Decoding the ancient Greek astronomical calculator known as the Antikythera Mechanism

T. Freeth<sup>1,2</sup>, Y. Bitsakis<sup>3,3</sup>, X. Moussas<sup>3</sup>, J. H. Seiradakis<sup>4</sup>, A. Tselikas<sup>5</sup>, H. Mangou<sup>6</sup>, M. Zafeiropoulou<sup>6</sup>, R. Hadland<sup>7</sup>, D. Bate<sup>7</sup>, A. Ramsey<sup>7</sup>, M. Allen<sup>7</sup>, A. Crawley<sup>7</sup>, P. Hockley<sup>7</sup>, T. Malzbender<sup>8</sup>, D. Gelb<sup>8</sup>, W. Ambrisco<sup>9</sup> & M. G. Edmunds<sup>1</sup>

The Antikythera Mechanism is a unique Greek geared device, constructed around the end of the second century ac. It is known148 that it calculated and displayed celestial information, particularly cycles such as the phases of the moon and a luni-solar calendar. Calendars were important to ancient societies<sup>20</sup> for timing agricultural activity and fixing religious festivals. Eclipses and planetary motions were often interpreted as omens, while the calm regularity of the astronomical cycles must have been philosophically attractive in an uncertain and violent world. Named after its place of discovery in 1901 in a Roman shipwreck, the Antikythera Mechanism is technically more complex than any known device for at least a millennium afterwards. Its specific functions have remained controversial"11 because its gears and the inscriptions upon its faces are only fragmentary. Here we report surface invaging and high-resolution X-ray tomography of the surviving fragments, enabling us to reconstruct the gear function and double the number of deciphered inscriptions. The mechanism predicted lunar and solar eclipses on the basis of Babylonian arithmeticprogression cycles. The inscriptions support suggestions of mechanical display of planetary positions",14,19, now lost. In the second

planetary cycles. We note that a major aim of this investigation is to set up a data archive to allow non-invasive future research, and access to this will start in 2007. Details will be available on www.antikythera-mechanism.gr.

The back door inscription mixes mechanical terms about construction ("trunnions", "gnomon", "perforations") with astronomical periods. Of the periods, 223 is the Saros eclipse cycle (see Box 1 for a brief explanation of astronomical cycles and periods). We discover the inscription "spiral divided into 235 sections", which is



## An ancient Greek 'tablet'



## Ancient optical instruments, lenses, and mirrors.


Ancient Greek Optical instruments, Lenses, **Mirrors and Complex Systems XENOPHON MOUSSAS Department of** Astrophysics, Astronomy and Mechanics, Faculty of Physics, School of Science, National and Kapodistrian University of Athens, tel. +30 6978792891, xmoussas@phys.uoa.gr, xmoussas@gmail.com, xmoussas@yahoo.com 1st conference International Academy of the **History of Science CIAHS Athens 2019** 





Fig. 3 Two lentoidal objects with focal length around 7 to cm from the Archaeological Museum of Heraclion. Courtesy Archaeological Museum of Heraclion, Mrs K. Athanasaki and Mr George Marakis.





The Society for the Study of the Ancient Greek Mythology

### Homer's Odyssey named 'world's greatest tale ever told'

### Dedication,

This Zoom presentation which was organized by NASE on the 8<sup>th</sup> of October 2022, globally, is dedicated in the memory of the Astronomer, Mathematician par excellence, Natural Philosopher Ypatia (YTATIA) of Alexandria, graduate of Plato's Academy, which was the first European University functioning in Athens and which was, then, in its 800<sup>th</sup> year. The Academy was formed by Plato in the 4<sup>th</sup> century BC. Ypatia was close to ideas expressed by Galileo and Newton since she has the way to observe and measure with instruments more advanced than the 2ed century BC Antikythera Mechanism. Ypatia had a brilliant mind since she knew Archimedes' findings in connection with the weight's concept of a body. She knew astronomer Aristarchos' heliocentric theory who conceived it in Alexandria. Her School of Thought in Alexandria and the written documents of findings of the researchers and her life itself had a tragic end!

### THE ANCIENT RELATION IN SPAIN BETWEEN THE MILKY WAY AND THE ST. JAMES WAY NASE UNESCO PROJECT, OCTOBER 874, 2022

José Ángel Docobo Durántez Ramón María Aller Astronomical Observatory University of Santiago de Compostela Galicia, Spain













































### Thank you for your attention



man

## Latitude for Traveling and Navigation

**October 7, 2022** Viladecans



# Viladecans

France Greece Italy Lithuania 0 Mongolia Paraguay Philippines Romania Spain
Utah, USA

Teachers from different parts of the world participated in the **NASE-UNESCO** Project and did the activity with the students in

> Plaza de la Diversidad Plaza de los Voluntarios Olympicos Plaza Constitucion **Torrente Ballester** Plaza de la Vila







United Kingdom France Frence

Viladecans

### Tunisia





### Parque Torrent Ballester





![](_page_100_Picture_0.jpeg)

![](_page_101_Picture_0.jpeg)

![](_page_101_Picture_1.jpeg)

![](_page_102_Picture_0.jpeg)

![](_page_103_Picture_0.jpeg)

![](_page_104_Picture_0.jpeg)

![](_page_105_Picture_0.jpeg)

![](_page_106_Picture_0.jpeg)

![](_page_107_Picture_0.jpeg)
Cuando no hay sold usamos cuadrato con la estrella polar y el angêulo es exacto a la latitud.

Me he sentido feliz y todo era muy raro porqué te hablan en ingles pero la mayoria lo entendia.

A mi me ha gustado mocho, por que he aprendido mucho sobre la tierra y la historia.

A sido muibien detodo y de critobal colomy cadrato y de lo amgulos.

Me de sontida contentra, Parque la esplicabon muy bien r la entendia.

MONTSERRATINA

5 MONSERATINA SCHOOL VI

Me ha encantado no lo he entendido mucho Doae: Me ha gustado mucho la activida d pero el ingles na lo entendia la chica Se llamaba Paula chis es muy majao GRACIAS II Me ha gustado mucho ra sido mut divetido A mi me a gritade anque padia over side ALEGRÍA 

"I was so happy to find out about Christopher Columbus and Magellan, how they navigate around the world"

"Even I don't know English so well, I understood the explanation."

"I learned how a quadrant works and how to use it both day and night."

"I like the activity very much even if it was not in Spanish."

"We were so happy to find out different things about history and science."







# Merci



# Efcharistó





# Thank You

# Salamat po



# Nutumesc





## Elcano. The greatest adventure of the history.

## REAL INSTITUTO Y OBSERVATORIO DE LA ARMADA



Captain Dr. Antonio A. Pazos García Director Royal Spanish Navy Observatory



### What did they know?

Ptolemy Theory: Geocentric model. Flat Earth.

#### 1492: C. Columbus discover America.

Round Earth was accepted. Positioning at sea problem.

#### 1500: Juan de la Cosa Nautical Chart.

America was a wall in the route to the Moluccas islands.





## 1513: Vasco Núñez de Balboa discovered the South Sea.

Crossed the isthmus of Panama and, on behalf of the Kings of Spain, took possession of the newly discovered ocean: **South Sea**.



### The great problem: positioning at sea.

#### The tools:

- Compass.
- Nautical Charts.
- Quadrant.
- Hourglasses.
- Astrolabes.
- Log line.
- Astronomical tables.



Zacut perpetual almanac (1496)



#### How do they get the position at sea?:

- Route estimation: course & velocity.
- Latitude: Polar, Sun or stars observations.
- Longitude: Solved at the end of 18<sup>th</sup> century. Marine Chronometers.

They didn't really know where they were at sea.



### Magellan expedition: the prelude.

PROPOSAL:

Reach the islands of the species from the West.

#### **OBJECTIVES:**

Find a route to the new sea. Positioning of the Maluku Islands. Respect the treaty of Tordesillas.





The Fleet & crews: 5 vessels (239 men / 244?). Tinidad (62) / San Antonio (57) / Victoria (45) / Concepción (44) & Santiago (31).

#### Departure:

Seville: Agoust 10<sup>th</sup>, 1519. Sanlúcar de Barrameda: September 20<sup>th</sup>, 1519.

40 days in Sanlúcar! Why?



#### Crossing the Atlantic ocean. The adventure begins.



Sanlúcar de Barrameda: September 20<sup>th</sup>, 1519.
Canary islands: September 26<sup>th</sup>,1519.
Río de Janeiro: December 13<sup>rd</sup>, 1519.
Exploration of the Rio de la Plata (22 days)
Sinking of the nao Santiago
Port of San Julián: August 24<sup>th</sup>, 1520 (after 148 days waiting).
Port of Sta. Cruz: October 18<sup>th</sup>, 150 (after 53 days waiting).

#### THEY DISCOVERED THE CANAL: PACIFIC OCEAN.

Cabo Vírgenes discovery: October 21<sup>st</sup>, 1520. Arrival to Pacific: November 28<sup>th</sup>, 1520. The **nao San Antonio** deserts. Excuse: back to Spain with the news.







### REAL



## ATORIO ARMADA



#### Magellan expedition: a new ocean.

Shark island: January 21<sup>st</sup>, 1521. San Pablo island: February 4<sup>th</sup>, 1521. GUAM island (Marianas): March 6<sup>th</sup>, 1521.

3 months & 20 days without new provisions/water.



Philippines islands:

Samar: March 16<sup>th</sup>, 1521. Homonhom: March 17<sup>th</sup>, 1521. Limasawa: March 28<sup>th</sup>, 1521. Cebú: April 17<sup>th</sup>, 1521.

MACTÁN: APRIL 27<sup>th</sup>, 1521. † Death of Magellan.

Cebú: May 1<sup>st</sup>, 1521.

Betrays the Spaniards (dinner trap). † 26 men were killed.

Lopes Carvalho: the new leader. Nao Concepción were burned (115 men alive).

August 15<sup>th</sup>, 1521.

Lopes Carvalho is dismissed. Gonzálo Gómez de Espinosa is the new leader. Juan Sebastian de Elcano was promoted to Captain of the nao Victoria.





#### The return trip: a great odyssey.



#### Moluka islands:

Novembre 8<sup>th</sup> – December 8<sup>th</sup>, 1521. Ships loaded with clove. Trinidad had problems (back Tirode island).

#### **ELCANO RETURN BY THE PORTUGUESE ROUTE**

NAO VICTORIA departure from Tirode island: December 21<sup>st</sup>, 1521. Crew: Between 59-70 men. Load: 27 tons of clove.

> February 27<sup>th</sup>, 1522: Started the back trip. (Timor island)

May 22th, 1522: Cape of Good Hope

July 10<sup>th</sup>, 1522: Cape Verde islands (3 days). They thought it was July 9<sup>th</sup>.

Sanlúcar: September 6<sup>th</sup>, 1522 (<u>18 men</u>).

Seville: September 8<sup>th</sup>, 1522.



Almost 5 month without new provisions & water.

## THANKS





11-12

## Seminaries NASE+, Roadmaps November 8th, 2022

## Treaty of Tordesillas: The Iberian Context

Sofia Condessa

Associação de Professores de História

Portugal



- In the first half of the fifteenth century, there was already a good knowledge about new seas and lands, raising interest and rivalry between the Portuguese and the Castilians.
- In 1479 the Treaty of Alcáçovas was signed, which gave Castile dominion over the seas north of the Canary Islands, and to Portugal the monopoly of the seas south of the archipelago, including the coasts of Africa, <u>the</u> islands of Madeira and Azores.
- In the following decades, navigators in the service of Portugal, or of Castile and Aragon, expanded Europe's knowledge of the world. One of the goals was to discover the sea route to India, either by circumnavigating Africa by the South, or by sailing westward.



Treaty of Alcáçovas, 1479



Fernão Vaz Dourado, Carta pre Mercator, 1571

- The rules of navigation from the position of the sun were known in the 13th century, and throughout the 15th century, the Portuguese pilots improved astronomical navigation, sailing the Atlantic first by estimation, then by comparison of the heights of the North Star.
  - Navigators considered the latitudes, the meridian height and the declination tables of the Sun, as well as the calculation of the number of leagues sailed between two parallels.
  - Astronomers, pilots, mathematicians and cartographers, such as Pedro Nunes and D. João de Castro, contributed to the nautical science.
- Books were published, such as the Libros del Saber de Astronomía, Regiment of the Sun, Regiment of the North Star, Regiment of Leagues.
- However, in cartography, the information was distorted by the use of an equal ruler of leagues in all latitudes and by the magnetic variation.

• Christopher Columbus offered to discover the sea route to India on behalf of Portugal by sailing westward. The Portuguese king refused, knowing that Columbus's calculations about the size of the globe fell short, and that his pilot Diogo Cão was close to the passage from the Atlantic to the Indian Ocean, by south. In 1492, Columbus reached the Antilles in the service of Castile and Aragon. On his return, he docked in Lisbon and King João II claimed the new lands, under the

Treaty of Alcáçovas.



(nationalgeographic.pt)

• Spain requested the intervention of Pope Alexander VI, who published the Bula Inter Coetera, dividing the world into two hemispheres, assigned to Portugal and Spain, by a meridian 100 leagues west of the Azores or Cape Verde.

 On June 7 of 1494, delegations from Portugal and Spain met in Tordesillas, and agreed on a pole-to-pole line 370 leagues west of Cape Verde: all lands west of that line would belong to Spain, and all to the east would belong to Portugal, which would come to encompass part of Brazil, raising the hypothesis that it was already known by the Portuguese.



- The demarcation line of the areas of influence of Portugal and Spain was defined by politicians. Nobody knew exactly where the line of the Treaty passed, since in the 15th century there was no way to measure longitude accurately.
- The treaty indicated that the line should be established by "wind directions" and "degrees of the sun and north" star.
- On the seas, pilots were using the magnetic heading, making an error corresponding to the magnetic declination, which they corrected with the knowledge of sea currents and winds.



• The first circumnavigation voyage (1519-1522), launched by Ferdinand Magellan, brought a new need to know where the line passed on Pacific Ocean and whether the spice-producing Molucca Islands were located would belong to Portugal or Spain.



Mapa Mundi do Atlas Portulano de Battista Agnese (1544)

- The commissioners of Portugal and Spain met again in 1524. Various solutions were proposed, based on angular distances between the moon and the sun or other star, on lunar eclipses or on an instrument which would record the time on the reference meridian and thus, by time difference from there to a destination, determine the longitude.
- However, there was a lack of accurate instruments, that would only be used in the 17th and 18th centuries, such as the octant, the sextant, or the ship's chronometer.



IberianMareClausum.svg

- These treaties were based on the principle of *Mare Clausum* (closed sea): the navigation of the seas and the exploration and territories would be exclusive to the Iberian states, which only had to agree among themselves which part would belong to each one, blocking navigation to other countries, seizing their vessels or demanding taxes on their passage, fishing or trade.
- It left out the ambitions of other Europeans and did not consider the peoples of the regions concerned. During the 16th century, this scenario changed: the French, English and Dutch launched their voyages of exploration and openly challenged the Iberian monopoly.
- Later, between Portugal and Spain, the treaty became a mere formality, both in Asia and Brazil, as the Spanish settled in the Philippines and the Portuguese advanced into the interior of Brazil, far beyond the limits defined by the Treaty. The formal revocation of the Treaty of Tordesillas by Portugal and Spain, however, only happened in 1750.

"Los marcadores solares mesoamericanos como dispositivo calendárico: un ejemplo de conocimiento migrado a larga distancia"

"The meso-american pecked cross as a calendar device: an example of long-distance migration knowledge"



Dr. Rodrigo Esparza López Centro de Estudios Arqueológicos El Colegio de Michoacán, A.C. resparza@colmich.edu.mx



Lámina 44. Los rumbos del universo.

Directions of the universe in the prehispanic cosmogony in old societies in México





Archaeological site of Teotihuacan







Differents kinds of Pecked Cross discovered in archaeological sites El sitio arqueológico de la Presa de la Luz como ejemplo de expansión del conocimiento

The archaeological site of Presa de la Luz an example of expansion of knowledge

#### Los Altos de Jalisco

Escribe una descripción para tu mapa.

Zacatecas

Aguase

Presa

l uz

### TUNAL GRANDE An Luis Potosi S

Puerto Vallarta

NAYARIT

Tepic

Guadalajara

### SANTIAGO CHAPA®A-LERMA

9León GUANAJUATO BAJIO Irapuato

Santia

Morelia

#### Google Earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO mage Landsat / Copernicus Manzanillo COLIMA

MICHOACÁN

















Conjunto D Roca 3 Desviado 11º al Ponierte del Norte Modidas 225 om largo 145 om ancho MiFR/MR

1 10 10 10 40 50

100 cm









Complejo arqueológico «Los Agaves»

Presa de la Luz

731 m

2012

Image © 2013 DigitalGlobe © 2013 INEGI © 2013 Google

La Luz 10 y 11

Google earth

13

16

g

N

Fechas de imágenes: 4/10/2012 13 Q 797985.67 m E 2286432.72 m N elevación 2185 m alt. ojo 5.48 km 🔾

#### Marcador solar de Quiringüicharo, Mich.



Mediciones azimutales durante el equinoccio de primavera en el marcador de Quiringüicharo.

Sunrise view on the spring equinox (03-21-1998), note that the first rays of the sun reflect (flare) exactly a beam of light parallel (90°) to the axis of the marker points.



Vista del amanecer en el equinoccio de primavera (21-03-1998), obsérvese que los primeros rayos solares reflejan (flare) exactamente un haz de luz paralelo (90°) al eje de puntos del marcador.


Presa de La Luz, municipio de Jesús María, Jalisco.

Observaciones el día 20 de marzo de 2018 (Equinoccio de primavera)

Fotos Mario A. Rétiz García



Presa de La Luz, municipio de Jesús María, Jalisco.

Observaciones el día 21 de marzo de 2018 (Equinoccio de primavera)

Fotos Mario A. Rétiz García

### Regionalización de las cruces punteadas.

#### SIMBOLOGÍA

Cruces punteadas

0

Cruces punteadas no verificadas en campo

Variantes de cruz punteada

Concentraciones por región de la cruz punteada



#### LEYENDA

1.- Cuenca de México

- 2.- Cuenca Lerma-Chapala
- 3.- Septentrión Mesoamericano
- 4.- Zona Maya
- 5.- Zona Zapoteco-Chantina
- 6.- Sierra de Mascota, Jal.

Mario Rétiz y Efrain Cárdenas El Colegio de Michoacán, A. C. Distribución de cruces punteadas y su coincidencia con la ruta sugerida del comercio de la turquesa.

#### Leyenda:

0

- Cruces punteadas
- Cruces punteadas no verificadas en campo

Variantes de cruz punteada

 Distribución y posibles rutas de interacción de la cruz punteada

Ruta sugerida de comerció e intercambio de la turquesa para la época clásica. (Weigand:1991)



Mario Rétiz y Efraín Cárdenas El Colegio de Michoacán, A. C.

### **COMENTARIOS FINALES**



50 cm.

## What happened to the nort

Constructions in the Kogi community of the Sierra Nevada de Santa Marta Mauricio Giraldo Buitrago Colombia

Reflections achieved during my degree work to qualify for the title of Master in Teaching Natural Sciences.

# Who are we talking about





YOLIMA, RUMALDO Y LEONARDO NIEVES SOSTIENEN EL TELÓN: JOSÉ NACOGUI Y MAMA ALFONSÓ O ARHUACO- KOGUL MALAYO, RÍO TUCURINCA, MAGDALEN

COSMOVISION

Hacer una casa implica un acuerdo:

NO SOLO CON la historia (nuestro origen, el del territorio y su cultura), Sino también con el sitio y las piedras del lugar; Con el Sol; Con el Bosque; Con los otros pueblos, nuestros hermanos; Con los hombres y los animales; Con lo negativo (el diáblo), con la cabeza y el cuerpo;

Y finalmente, con el corazón de la Tierra.

Juana Londoño Niño, Arquitectura y Bosque en la Sierra Nevada de Santa Marta. Santa Marta, Colombia. 2012



Figura 1. Concepción de los nueve niveles del Cosmo

Gerardo Reichel-Dolmatoff. Templos Kogi: Introducción al simbolismo y a la astronomía del espacio sagrado. 1975







