

FIND YOUR EXOPLANET

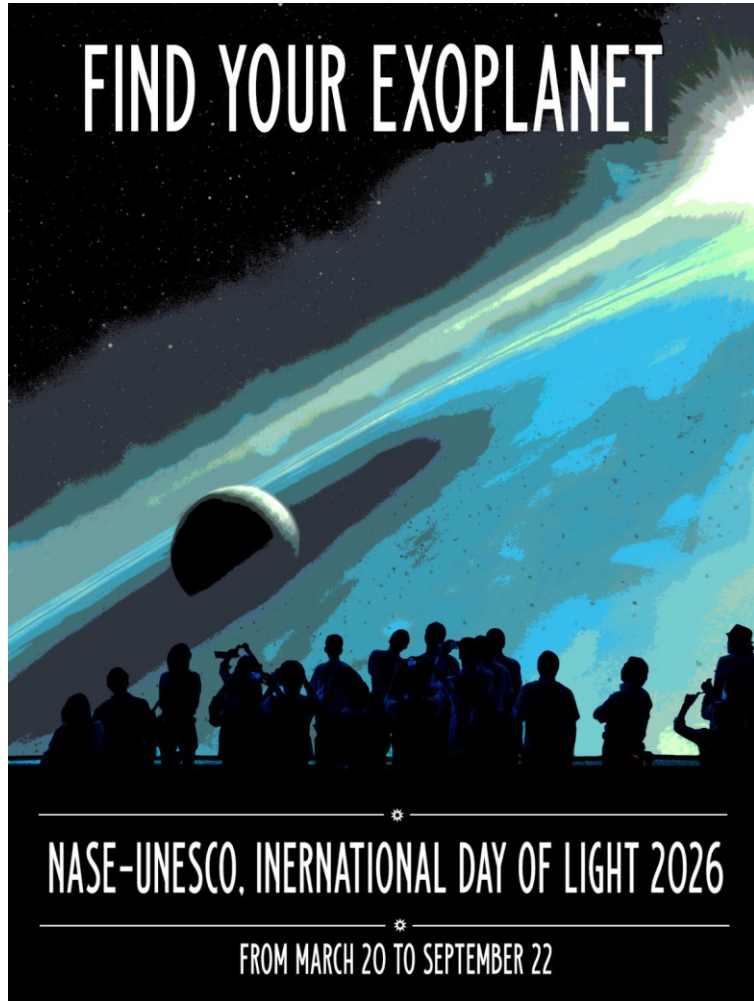
6th Bridge Between Cultures

March 28th, 2026

NASE-UNESCO, INTERNATIONAL DAY OF LIGHT 2026

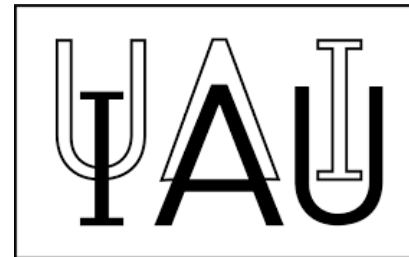
FROM MARCH 20 TO SEPTEMBER 22





FIND YOUR EXOPLANET

March 28th 2026



12:00 – 12: 15 **Welcome 6th Bridges between Cultures, Beatriz García and Rosa M. Ros, NASE, Argentina and Spain**

12:15 - 12:30 **How participate NASE-UNESCO project 2026, Ricardo Moreno, Spain**

12:30 – 12: 45 **Simulation of spiral galaxies, Riser Fahdiran & Nindhita Pratiwi, Indonesia**

12:45 – 13: 00 **Model of distances in the Solar System, Noorali Jiwaji, Tanzania**

13:00 - 13:15 **Example of choice Planet B, Corina Toma, Romania**

13:15 - 13:30 **NASA Exoplanet Catalog, Breezy Ocaña-Flaquer, Dominican Republic**

13:30 -13:45 **“Where on Earth is Mars? Gobi Desert for instance”, Tsolmon Renchin, Mongolia**

13:45 - 14:00 **“From the Sahara to Exoplanets: Life in Extreme Environments.”, Hichem Guergouri, Argelia**

14:00 - 14:15 **“The Northern Winter - Life at Limits”, Sakari Ekko & Kirsi Lehto, Finland**

14:15 - 14:30 **"Río Tinto: Mars on Earth", Fernando Ordoñez, Spain**

14:30 - 14:45 **Liquid Water on Mars, Alejandro Saravia, Honduras**

14:45 - 14:55 **Life in extreme conditions searching for a second Earth, Marc Metaxa, Greece**

14:55 - 15:00 **Panel Discussion 6th Bridge between Cultures**



12:15 - 12:30 How participate NASE-UNESCO project 2026, Ricardo Moreno, Spain

12:30 – 12: 45 Simulation of spiral galaxies, Ronny Syamara, Nindhita Pratiwi, Riser Fahdiran and Hakim L. Malasan. Indonesia

12:45 – 13: 00 Model of distances in the Solar System, Noorali Jiwaji, Tanzania

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How to participate in the NASE-UNESCO project 2026

Ricardo Moreno Luquero (NASE)

Document 1: Introduction

Table 3: List of candidates

	Name of the exoplanet	Mass (M_E)	Radius (R_E)	Distance to your star (AU)	Stellar mass (M_S)	Spectral type	Temperature of the star (K)
1	Proxima Centauri b	1,27	1,1	0,0485	0,12	M5.5V	3040
2	TRAPPIST-1 d	0,3	0,78	0,0214	0,089	M8V	2560
3	TRAPPIST-1 e	0,77	0,92	0,0282	0,089	M8V	2560
4	TRAPPIST-1 f	0,93	1,04	0,0371	0,089	M8V	2560
5	TRAPPIST-1 g	1,15	1,13	0,0451	0,089	M8V	2560
6	LHS 1140 b	6,6	1,73	0,093	0,18	M4.5V	3130
7	LHS 1140 c	1,8	1,3	0,026	0,18	M4.5V	3130
8	Teegarden b	1,05	1,02	0,0252	0,09	M7V	2900
9	Teegarden c	1,11	1,03	0,044	0,09	M7V	2900
10	Kepler-442 b	2,36	1,34	0,409	0,61	K5V	4400
11	Kepler-186 f	1,67	1,17	0,356	0,54	M1V	3755
12	Kepler-62 f	2,8	1,41	0,718	0,69	K2V	4925
13	Kepler-62 e	2,6	1,61	0,427	0,69	K2V	4925
14	Kepler-1649 c	1,25	1,06	0,0514	0,2	M5V	3240
15	Kepler-1229 b	2,7	1,40	0,289	0,54	M1V	3720
16	Kepler-452 b	5	1,60	1,05	1,04	G2V	5750
17	Wolf 1061 c	3,41	1,60	0,084	0,29	M3V	3380

Document 1: Introduction

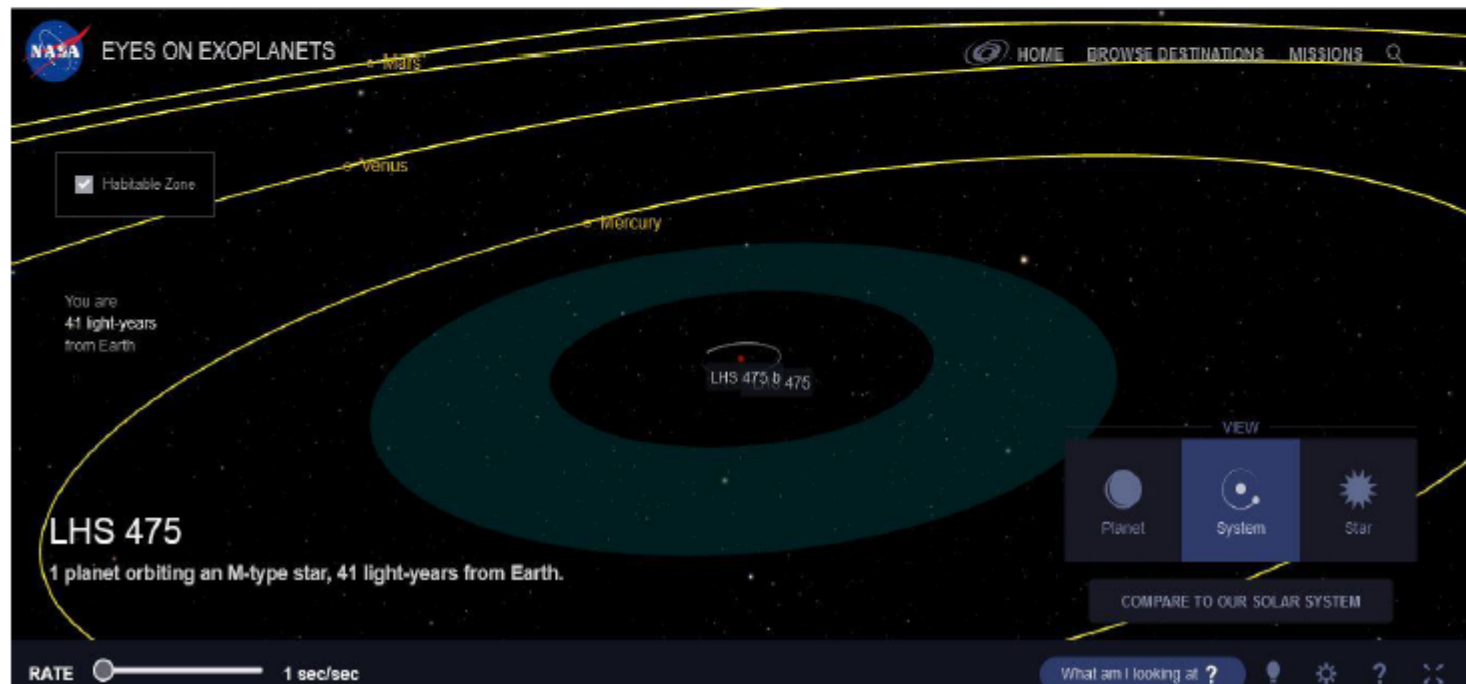
We can search for our exoplanet in two ways:

- A) We can choose an exoplanet from the following list (Table 3), with 30 candidates.
- B) Older students can search for the exoplanet using the following NASA links:

<https://science.nasa.gov/exoplanets/exoplanet-catalog/>

<https://eyes.nasa.gov/apps/exo/#/filter/type/terrestrial>

The second link allows you to view exoplanetary systems, to find exoplanets' sizes and whether they are in the habitable zone of the central star, to compare them with the planets from our Solar System, etc. (Figure 12).



Document 2: Report



Report for “Find Your Exoplanet”

Complete the first three experiments related to exoplanets. Take photos to prove that you did them. Choose at least three of the photos and include them on pages 2, 3, and 4 of this report. To do this, click inside the box and then drag each photo file into it. Next, complete Activity 4: choose an exoplanet that, in your opinion, could be a good candidate for a second Earth and fill in the information on page 5.

The report will be saved in PDF format and the file name will consist of the first three letters of the country, the month, the day, and any three numbers from 000 to 999. (For example, SPA0515123.pdf). The report must be uploaded to <https://forms.gle/1ETmDG8L8h2BYKX88>. You can send the reports from March 20 to September 22, 2026. The certificate will be sent as soon as the report has been uploaded.

Teacher's name:		
Names of students (maximum 3 students per report):		
The center/school where the activity took place:		
City and country:	Day, month, hour:	Latitude:

Document 2: Report

PHOTO 1: Click inside the box and then drag the photo file inside the box.



PHOTO 2: Click inside the box and then drag the photo file into the box.



"Find Your Exoplanet"

NASE-UNESCO. International Day of Light 2026



Simulation of spiral galaxies

[Activity 1]

Team Members:

Ronny Syamara [Jakarta Amateur Astronomy Association, Indonesia]

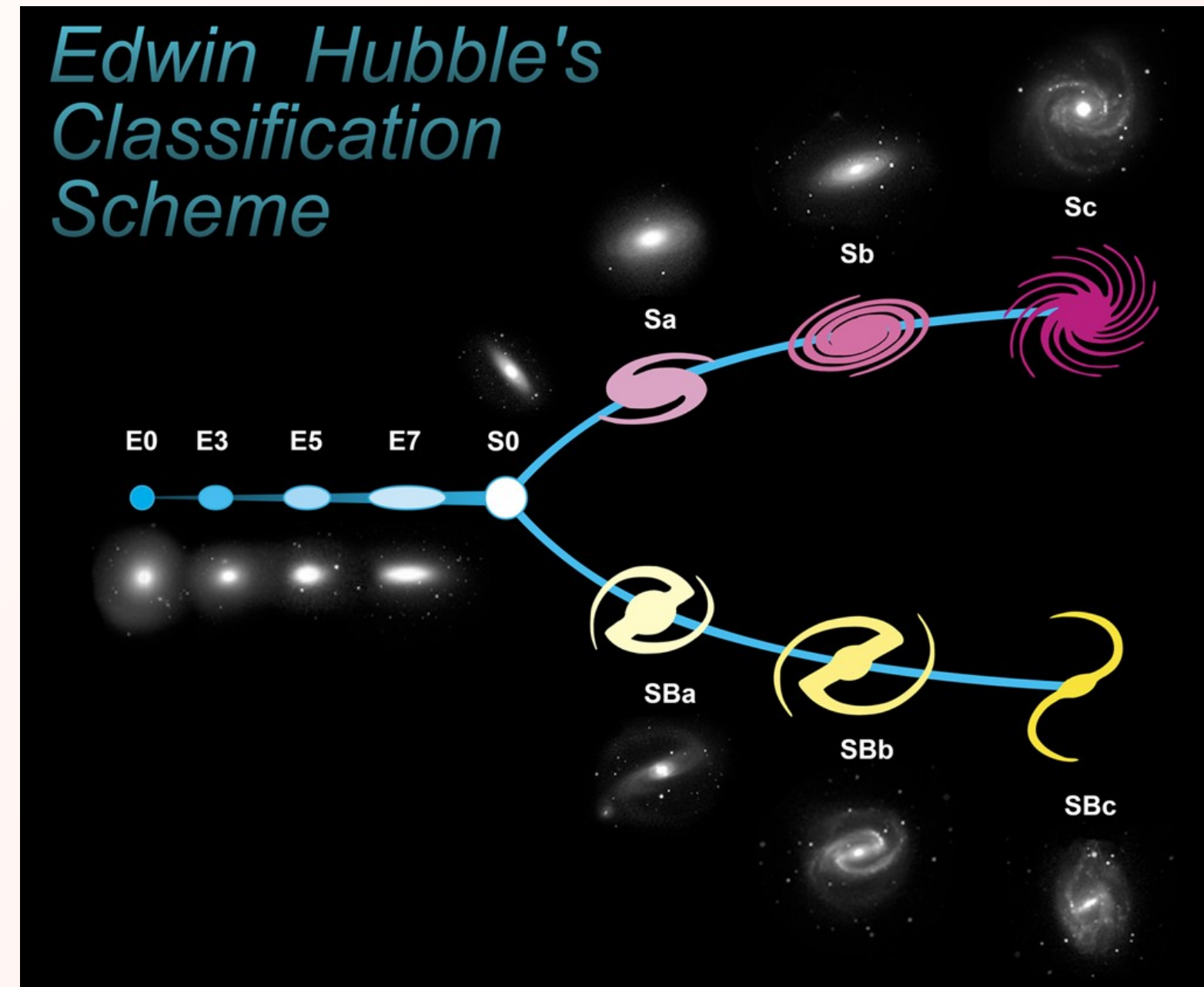
Nindhita Pratiwi [Institut Teknologi Sumatera, Indonesia]

Riser Fahdiran [Universitas Negeri Jakarta, Indonesia]

Hakim L. Malasan [Institut Teknologi Bandung, Indonesia]

Spiral Galaxy

- **The Hubble Tuning Fork:** A map of galaxy shapes—spirals, barred, and ellipticals. **Ours is spiral galaxy.**
- Hubble's sequence isn't an "evolutionary" timeline, but physics can explain how one shape might become another.
- **Our Goals:** Using the dynamics of water and material with small grain to recreate these cosmic structures.



Simulation of spiral galaxies

- A spiral galaxy model can be generated (Figure 1) with a glass full of water and a product that has very small grains
- For example, very fine sand, sodium bicarbonate or table salt (NaCl), although the latter has the disadvantage that it dissolves too easily in water (Figures 2 and 3)



Figure 1.
Galaxy NGC 5457 (ESA/Hubble)



Figure 2.
Galaxy with baking soda



Figure 3.
Galaxy with sand

Simulation of spiral galaxies



Fig. 4. Galaxy NGC 4565, with the central bulge (Credit ESO/NASA),



Fig. 5. Model with baking soda, seen from the side

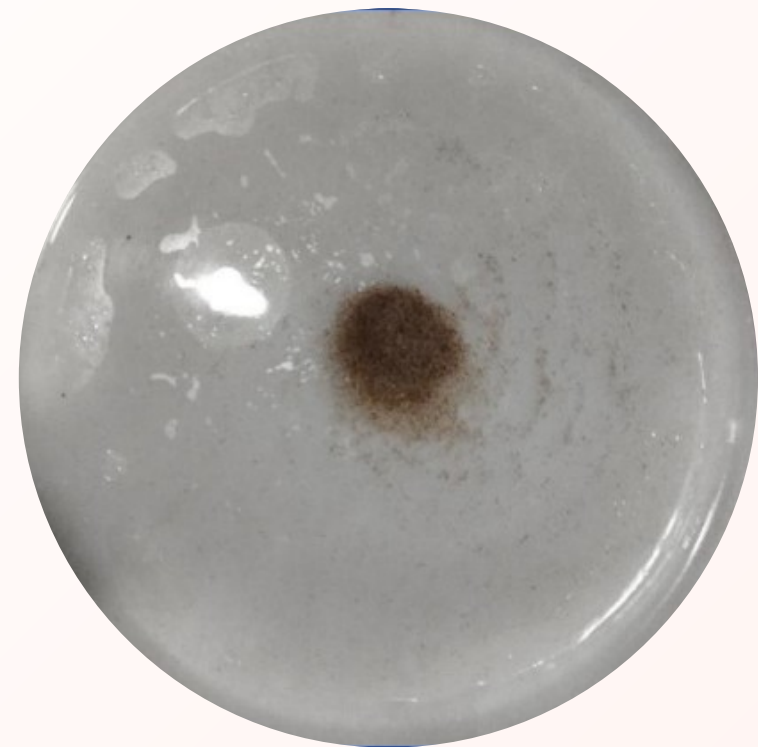
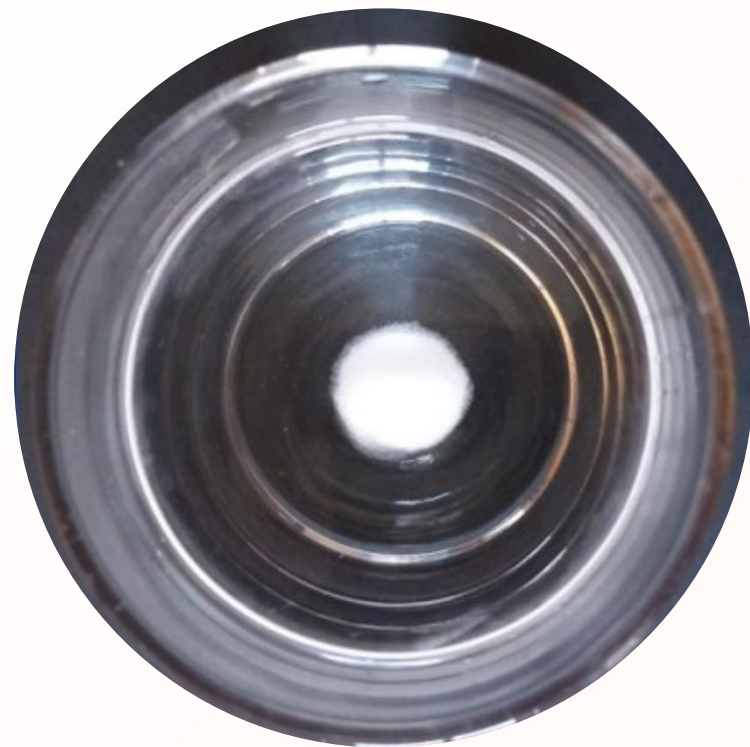


Fig. 6. Sand galaxy model, seen from the side

- Begin by stirring the water in the glass with a spoon at a fairly rapid pace.
- Stop stirring, add a spoonful of the available material, and wait for the grains to settle at the bottom of the glass.
- This will create a small mound of material in the center (the galaxy's nucleus or bulge) and spiral arms, very similar to those found in galaxies. Figure 4 shows a real galaxy viewed edge-on (NGC 4565) and the models obtained using baking soda and sand.



Simulation of spiral galaxies



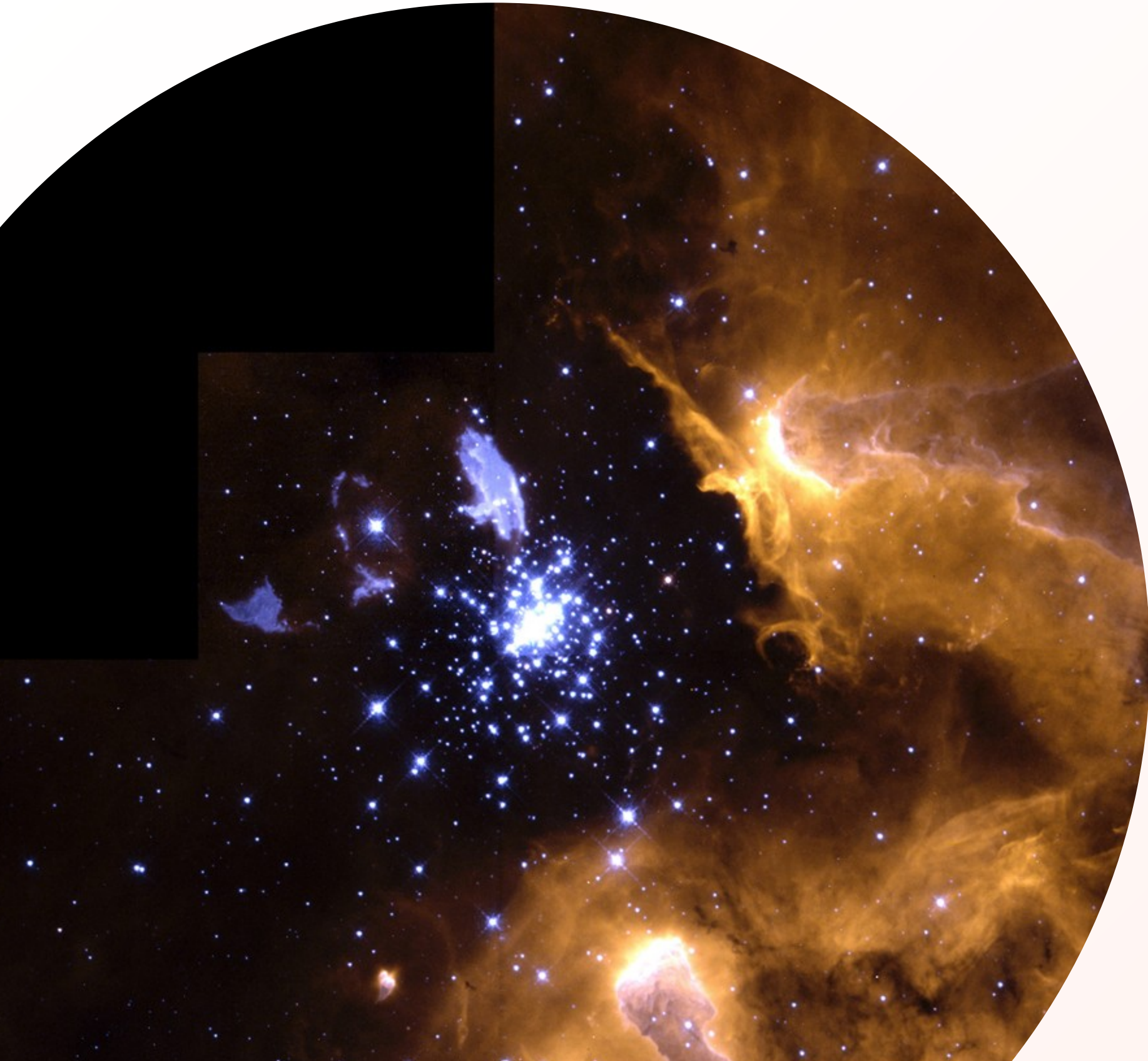
Once the initial spiral structure forms, the continued drainage of water transforms the distribution of matter into an elliptical morphology.

This process mirrors the natural evolution of galaxies, where spiral systems can eventually transition into elliptical ones.



Project Plan

- Collaboration with high school participating in NASE workshop
- Student activities in simulating spiral galaxies
- Report the results to “Find Your Exoplanet” program within the scheme of NASE-UNESCO on celebrating International Day of Light 2026
- The project will be carried out from April to September 2026





Thank
You

FIND YOUR EXOPLANET

**DISTANCES IN SOLAR SYSTEM
and Bode's Law**

DR NOORALI T. JIWAJI

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OPEN UNIVERSITY OF TANZANIA (OUT)

ASTRONOMY AND SPACE SCIENCE ASSOCIATION OF TANZANIA (ASSAT)

NASE-UNESCO, INTERNATIONAL DAY OF LIGHT 2026

Presentation 28 March 2026

Distances from Star

- Stars produce extremely high energy
- Energy received by planet depends on its distance from star
- Energy received by planet follows an Inverse square Law $I \propto \frac{1}{d^2}$
- Doubling distance reduces the energy by 4 times
- Tripling the distance will reduce the energy by 9 times (nearly ten times)

Distances in Solar System

- We can understand effect of distance using our understanding of how hot or cold our planets are in our own Solar System
- For example, Mercury is closest to the Sun and is extremely hot and so is Venus
- Mars which is further away from the Sun is colder than Earth
- Distant planets like Uranus and Neptune are very cold
- Earth has the moderate temperature for us to be able to live

Distances of Planets from the Sun – Bode's Law

- Bode's Law:
 - Distances from the Sun follow a roughly geometric progression,
 - Each planet is about TWICE as far as the PREVIOUS one
 - Mathematical form: $d = 0.4 + (0.3 \times 2^n)$
 - Bode's Law was derived empirically using observed distances of planets in our Solar System

Understanding Distances of Planets from the Sun

Distances of Planets to the Sun

Mercury	57 900 000 km		0.4 AU
Venus	108 300 000 km		0.7 AU
Earth	149 700 000 km		1.0 AU
Mars	228 100 000 km		1.5 AU
Asteroid Belt	410 000 000 km		2.7 AU
Jupiter	778 700 000 km		5.2 AU
Saturn	1 430 100 000 km		9.6 AU
Uranus	2 876 500 000 km		19.2 AU
Neptune	4 506 600 000 km		30.1 AU
Kuiper Belt (Pluto etc)	5,700,000,000 km		38.1 AU

Model of Distances of Solar System Planets

- Demonstrate making this model from a strip of paper using approximation of Bode's Law



- Only in the very small area to the left of the green line is the habitable zone in our Solar System

THANK YOU

FOR YOUR INTEREST

To Understand Wonders of ASTRONOMY



Example of a choice: Planet B

Dr. Corina Toma

National Pedagogical College "Gh. Lazăr"

Cluj-Napoca, Romania

Exoplanets

1995 - first exoplanet around a Sun-like star was discovered

2026 - over 5,700 exoplanets were confirmed

- thousands more candidates are not yet confirmed

Criteria for selecting a second Earth

1. Host star mass - less than or equal to 1.6 times the mass of the Sun

$$M^* \leq 1.6 M_{\text{Sun}}$$

2. Exoplanet mass - less than 10 times the mass of the Earth

$$M_e \leq 10 M_{\text{Earth}}$$

3. Exoplanet radius - less than 2 times the radius of the Earth.

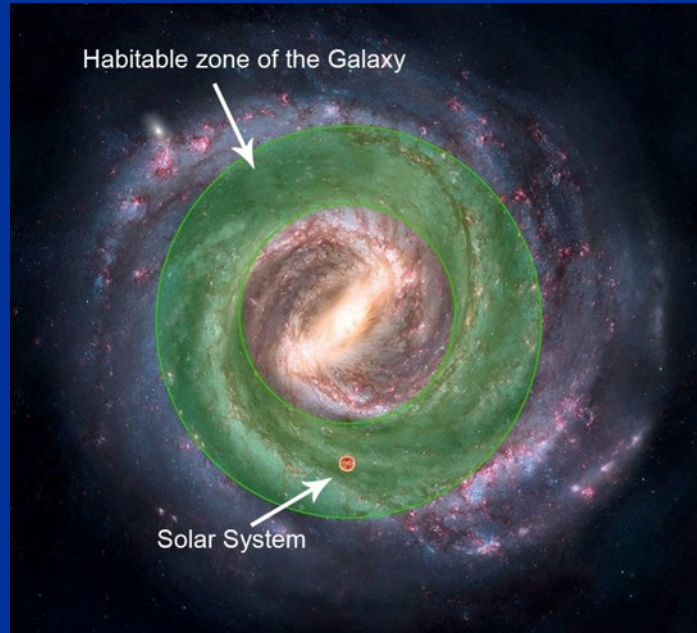
$$R_e \leq 2 R_{\text{Earth}}$$

Criteria for selecting a second Earth

4. Habitability zone – the distance between the host star and the exoplanet

Spectral Type	Temperature [K]	Habitability Zone [AU]
O6V	41 000	450-900
B5V	15 400	20-40
A5V	8 200	2.6-5.2
F5V	6 400	1.3-2.5
G5V	5 800	0.7-1.4
K5V	4 400	0.3-0.5
M5V	3 200	0.07-0.15

Habitability zone in the Solar System



From the galactic centre:

- **minimum radius: 23,000 light-years**
- **maximum radius: 30,000 light-years**

Looking for a second Earth

Name of the exoplanet	Mass (M_E)	Radius (R_E)	Distance to your star (AU)	Stellar mass (M_S)	Spectral type	Temperature of the star (K)
K2-72 e	2,2	1,29	0,106	0,27	M3V	3300
K2-72 c	2,4	1,3	0,106	0,27	M3V	3300
K2-3 d	1,7	1,48	0,208	0,60	M0V	3890
K2-18 b	8,6	2,61	0,143	0,36	M2.5V	3460

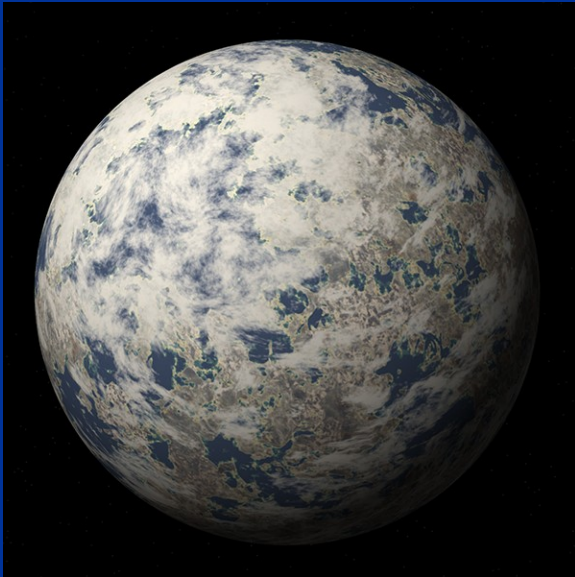
$M_e \leq 10 M_{\text{Earth}}$

$R_e \leq 2 R_{\text{Earth}}$

$M^* \leq 1.6 M_{\text{Sun}}$

Spectral Type	Temperature [K]	Habitability Zone [AU]
M0V	3890	0.20 – 0.40
M3V	3300	0.08 – 0.20
M5V	3200	0.07-0.15

Notable exoplanets



- TRAPPIST-1 e
- Proxima Centauri b
- K2-72 e



NASA EXOPLANETS CATALOG

AND WHY IS EARTH 2.0 NOT THERE?

Exoplanets

An exoplanet is any planet beyond our solar system. Most of them orbit other stars, but some free-floating exoplanets, called rogue planets, are untethered to any star. We've confirmed more than 6,000 exoplanets, out of the billions that we believe exist.

EXOPLANETS DISCOVERIES

Latest Discovery Data

Confirmed Exoplanets
6150

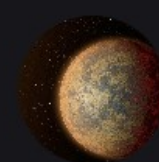
Star Count
4582

New Discovery
[KMT-2016-BLG-1337L b](#)

Exoplanet Catalog

This exoplanetary encyclopedia — continuously updated, with more than 6,000 entries — combines interactive 3D models and detailed data on all confirmed exoplanets. When you select a planet's name, see a visualization of each world and system, along with vital statistics. Filter by exoplanet type, by discovery method, or by the mission or facility that found it.

KEY TO EXOPLANET TYPES



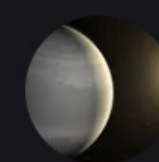
Terrestrial
A type of exoplanet made of rock or metal, smaller than Earth, possibly with oceans or atmospheres (artist's concept).



Super Earth
Super-Earth exoplanets are also rocky, but between Earth and Neptune in size (artist's concept).



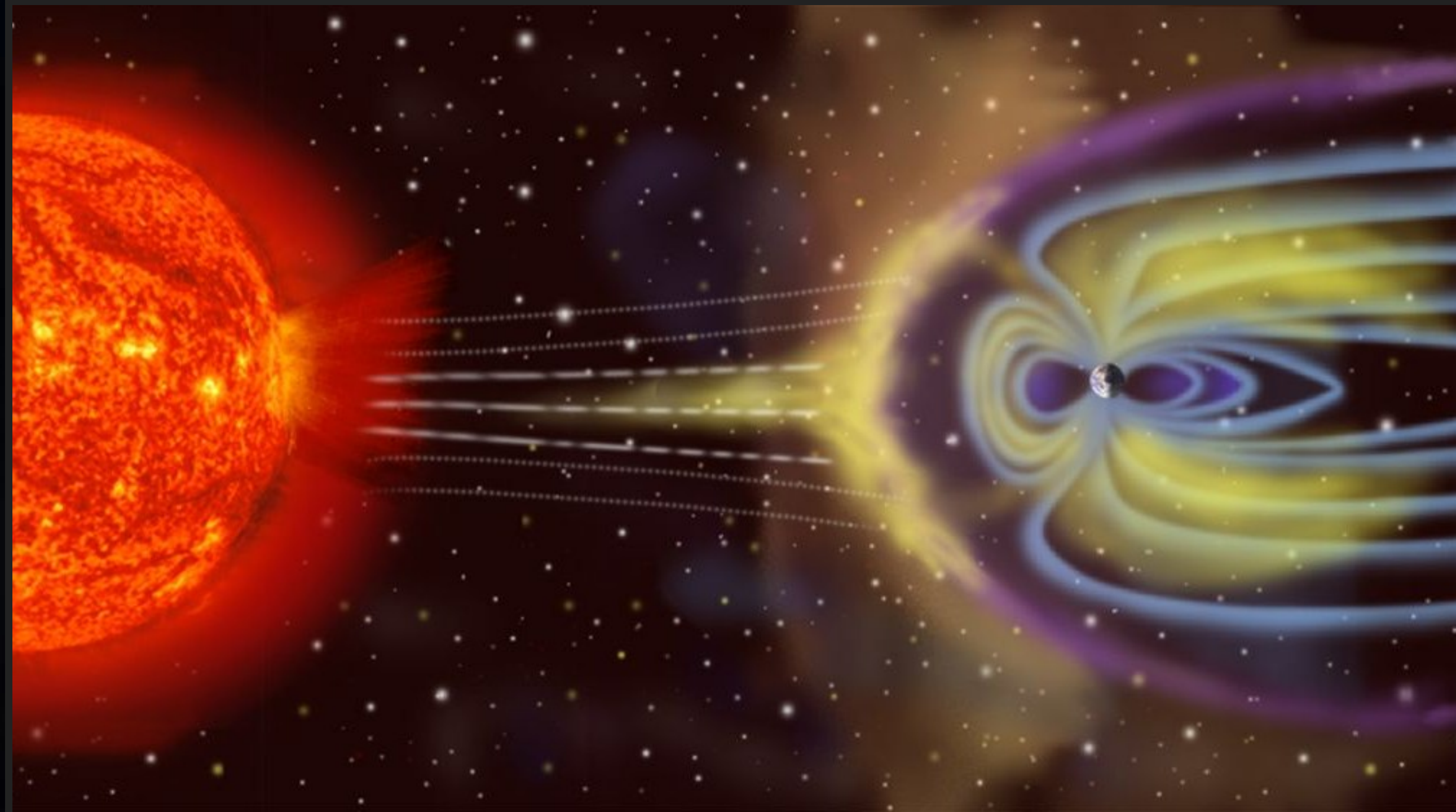
Neptune-like
This variety of exoplanet is similar in size to Uranus and Neptune, with an atmosphere of mostly hydrogen or helium (artist's concept).



Gas Giant
Gas Giant exoplanets are as massive as Saturn or Jupiter, or larger; this category also includes "hot Jupiters," which orbit close to their stars (artist's concept).

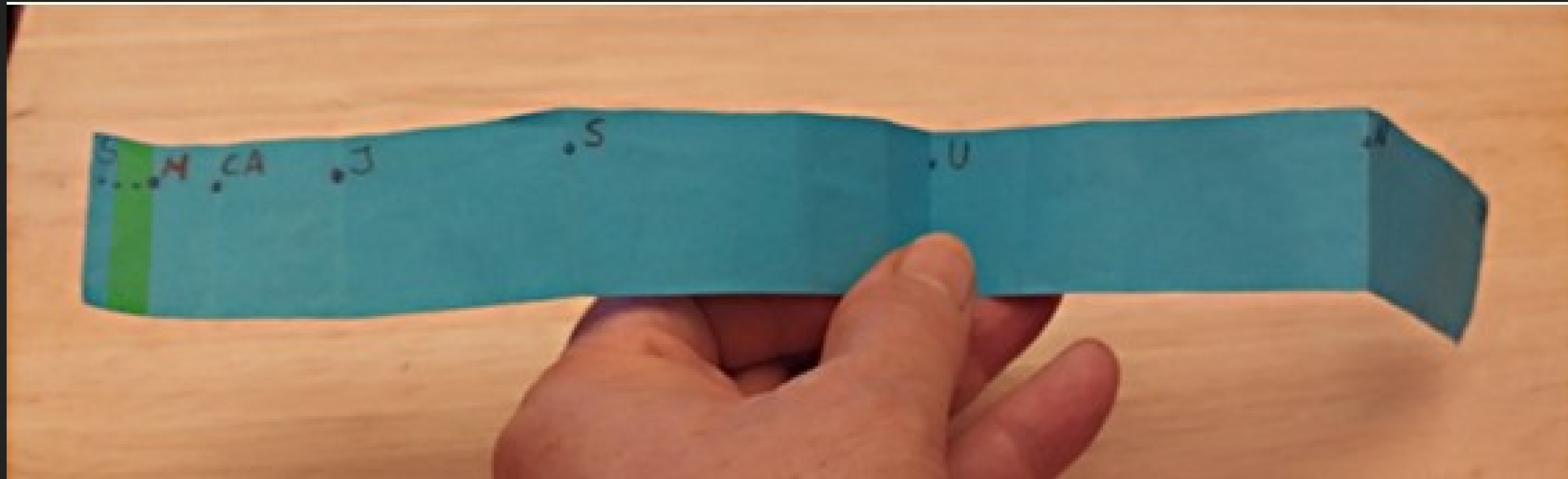
WHAT WOULD MAKE ANOTHER PERFECT EARTH FOR US?

- ▶ The distance from its Star
- ▶ The Atmosphere
- ▶ The magnetic Field
- ▶ Its location in the galaxy



LETS GO TO THE CLOSEST EXOPLANET AND SEE HOW LONG WOULD IT TAKE US.

Space is HUGE



IT WOULD TAKE US ~6500 YEARS



We should continue to learn as much as possible from all the planets out there, but not with the idea that we will replace our planet, or move to another planet.

Planet Earth is not disposable, and it is not replaceable. It is our home — the only one we have — and we carry the responsibility to protect it and to honor every form of life that shares it with us. Humanity must come together, stop fighting one another, and begin working side-by-side for our shared future. Because even if someday we gain the ability to live on another planet, there will never be a better world than this one. Life on Earth — humans, animals, plants, oceans, forests, every ecosystem — has coevolved over billions of years. No other world can replicate that. Earth is unique, and it is time we start treating it that way.

THANK YOU FOR YOUR
ATTENTION

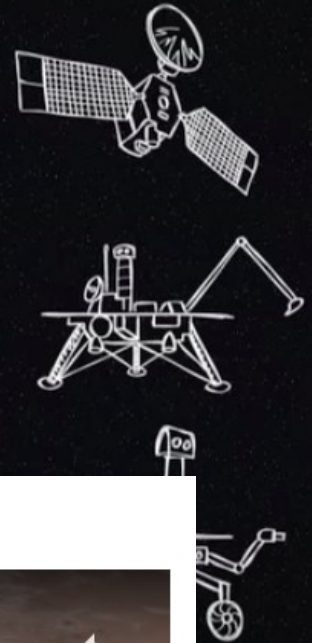
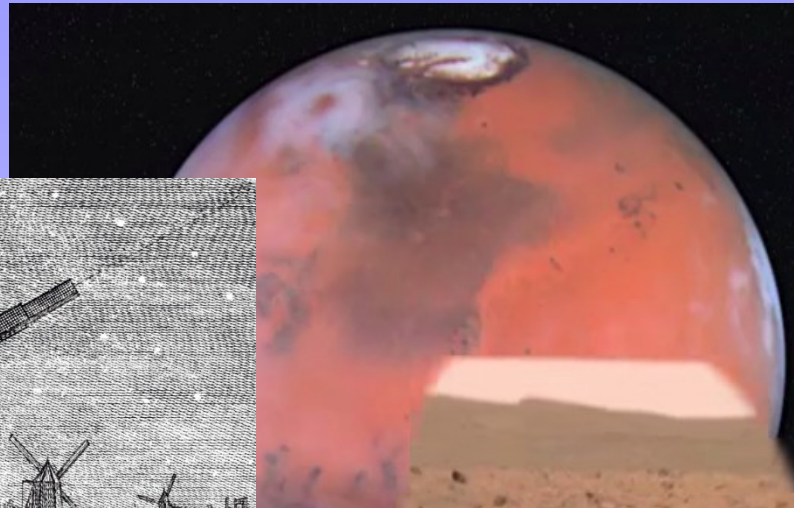
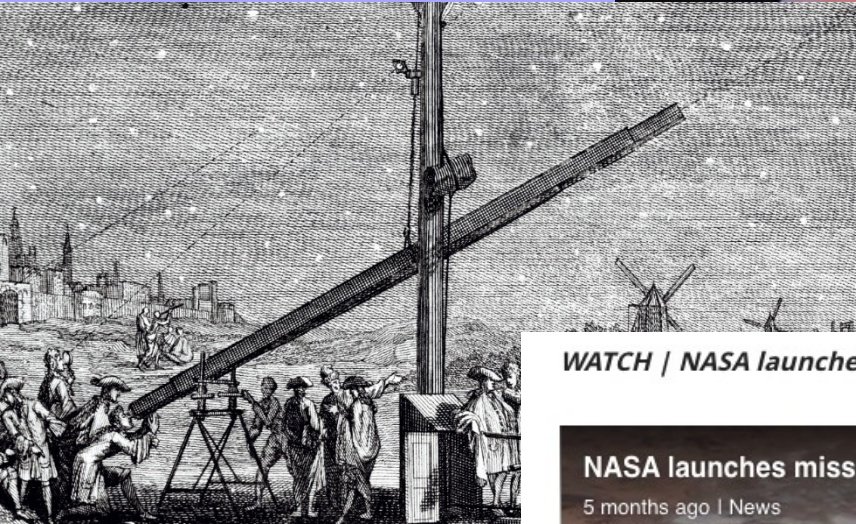


Where on Earth is Mars?

R.Tsolmon PhD

Remote Sensing
and Space Science Laboratory, Physics
Department, National University of
Mongolia





WATCH | NASA launches mission to Mars:

NASA launches mission to Mars
5 months ago | News

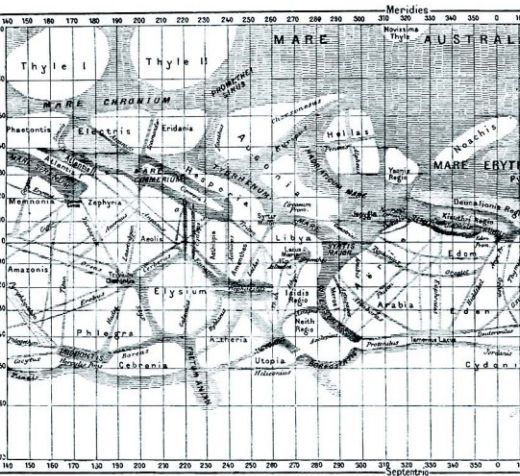
Share

CBC NEWS

▶ 🔊 1:20 / 1:53

CC [] []

This is a video player interface for a news segment. The main visual is a 3D rendering of a large crater on Mars, with a dark blue body of water in the center. Two white arrows point towards the water. The video player includes a play button, a volume icon, a progress bar showing 1:20 / 1:53, and icons for closed captions, a full screen, and a share button.





MONGOLIA

Name of Star: **Mazaalai** Name of Exoplanet: **Bambaruush**

1. **Research:** bring many science and technology skills useful to society.

2. **Education:** astronomy attracts young people to study science.

3. **Public outreach:** many people find the night-sky romantic and inspiring. Recent news of research in astronomy and space has a widespread public interest and following.

MONGOLIA

NATIONAL CAMPAIGN OVERVIEW

Number of proposals received in the country: **6000**

Number of votes received in the country: **9000**

CHARACTERISTICS OF SYSTEM

Constellation: **Ursa Major**

Star Identification: **HAT-P-21**

Host star type: **yellow, dwarf**

Coordinates: **RA 1h25m05.99s
DEC +41d01m40.6s**

RESULTS

Name of Star: **Mazalaai**

Brief explanation Name Star: Mazaalai is the Mongolian name for the endangered Gobi bear subspecies (*Ursus arctos gobiensis*) of the Gobi Desert region of Mongolia, and the name of the first Mongolian satellite.

Name of Exoplanet: **Bambaruush**

Brief Explanation Name of Exoplanet: Bambaruush is the Mongolian term for 'bear cub', the offspring of the endangered Mazaalai (Gobi bear) of the Gobi Desert.

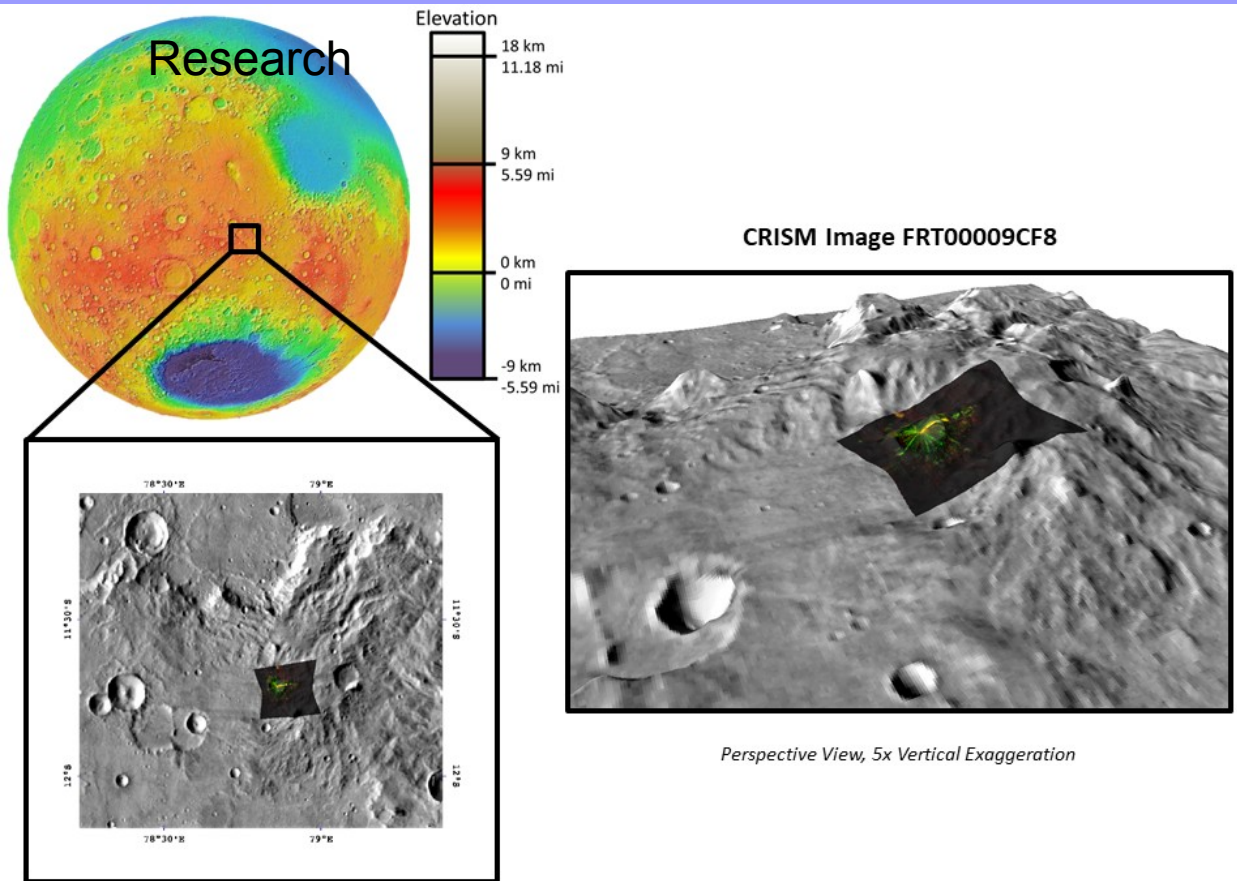
THEME

Mongolian names associated with the endangered Gobi bear (Mazaalai in Mongolian) and its habitats in the Gobi desert region of Mongolia.

www.iau-100.org
www.nameexoworlds.iau.org



Mongolian platea and Martian Tharsis



Mars is similar to Earth in many ways. Like Earth, Mars has an atmosphere and systems of air, water, ice, and geology that all interact to produce the Martian environment.

The Mongolian plateau on Earth and the Tharsis bulge on Mars share remarkable similarities in terms of large domal uplifted areas

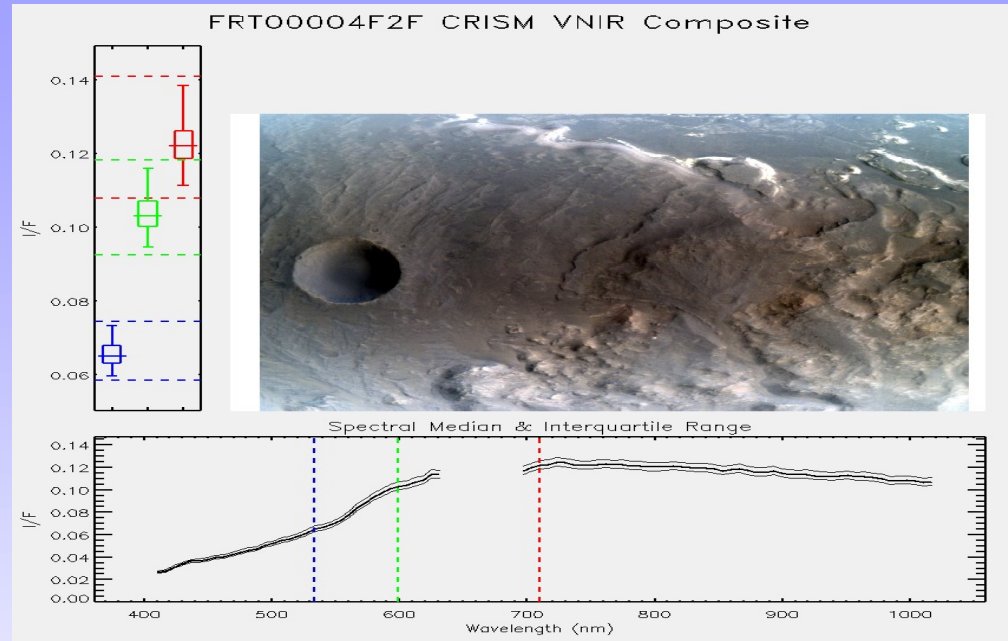
Comparative studies of the Mongolian plateau and Tharsis bulge provide excellent opportunities for understanding surface manifestations of plume-driven processes on terrestrial planets and how they interact with hydro-cryospheres.

https://www.researchgate.net/publication/233796193_Hydrogeologic_processes_of_large-scale_tectonomagmatic_complexes_in_Mongolia-southern_Siberia_and_on_Mars

Research for

Astro Geology

Trainings in the mysterious places in Mongolian Gobi similar to MARS



The project allows people to experience and conduct research for Mars

WHY MONGOLIAN GOBI similar to Mars's surface Mongolian Gobi is one of the 24 biggest deserts in the world, The dynamic, polar, dry environment 4 seasons Big difference in the temperature boundaries.



Citizen science and Outreach activity

the project provides many astronomical outreach activities allowing people to experience MARS

Train people for becoming amateur astronomers



- Contribution to:

Science teachers through Mars

Youths and kids in Mongolia have been showing increase in space science

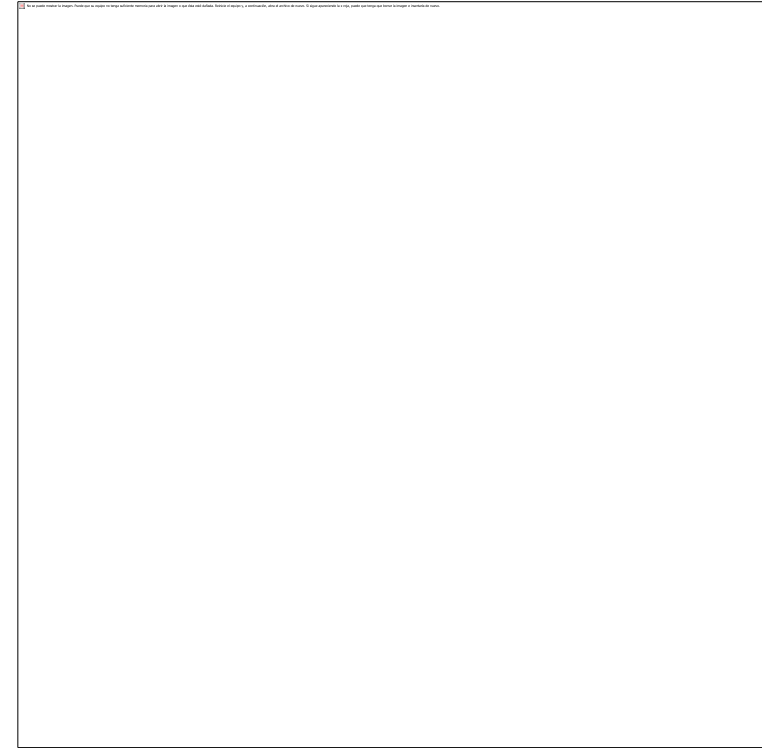
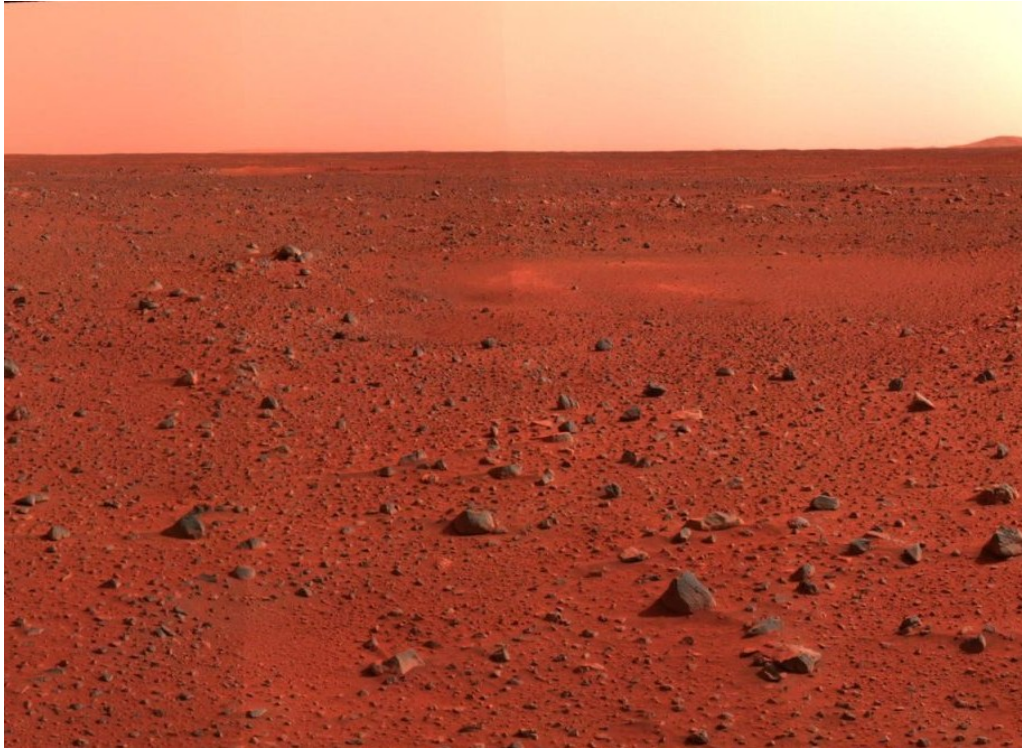
- Archeastronomy and Astro Tourism
- Astro culture
- Research, education and outreach
- International collaborations

It inspires teenagers to choose a career in *science and technology*



Thank you for
your attention

From the Sahara to Exoplanets: Life in Extreme Environments.



Presented by Dr. Guergouri Hichem

Research Unit in Scientific Mediation & Culture - CERIST



“When we imagine life of the best analogues a



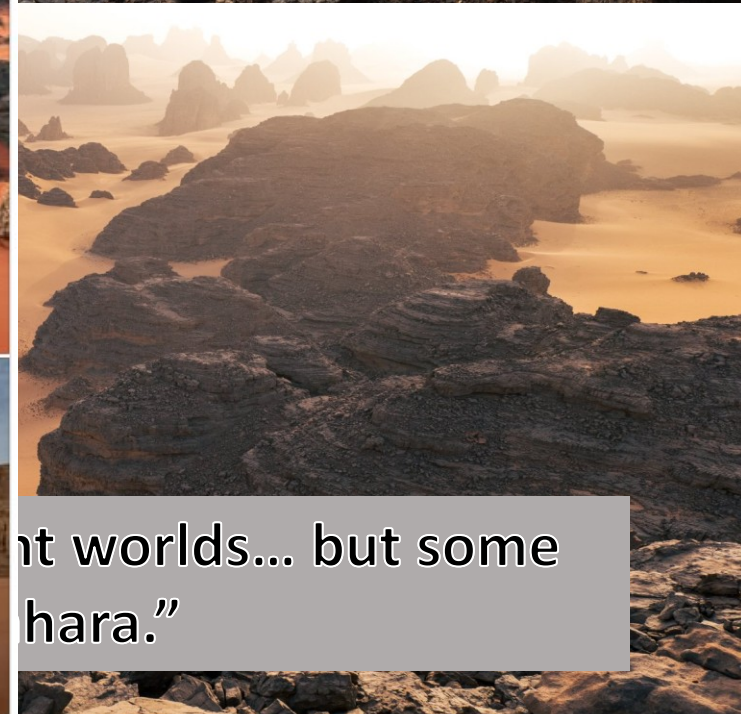
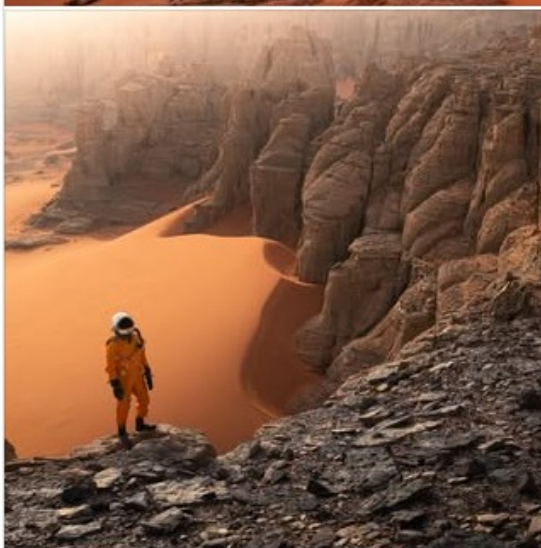
Andrew Studer 
about 4 years ago



I knew from the moment I first stumbled upon the Algerian Sahara that my astronaut photo series Space to Roam would be incomplete without it.

I spent nearly two weeks exploring the beautiful desert out of an off road vehicle, camping out under the stars and hiking all around the alien-like landscape with my good friend Neils who came out from The Netherlands to wear the suit and help me out!

Algeria is such a beautiful country and I can't wait to return!



nt worlds... but some hara.”

Algeria is the biggest Country in Africa

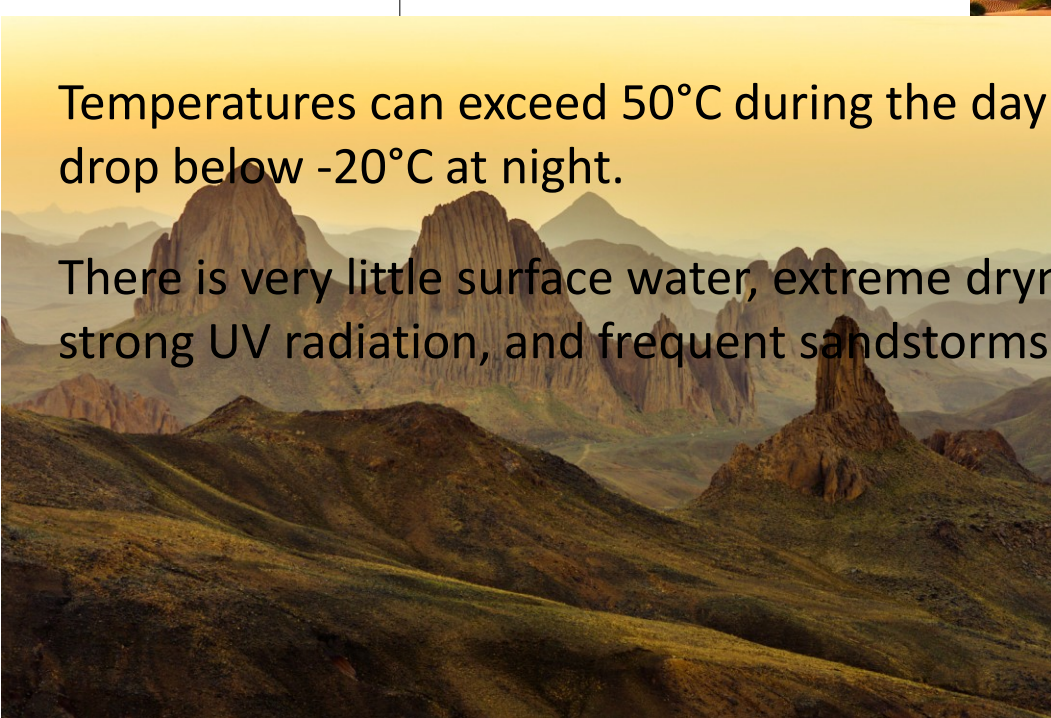
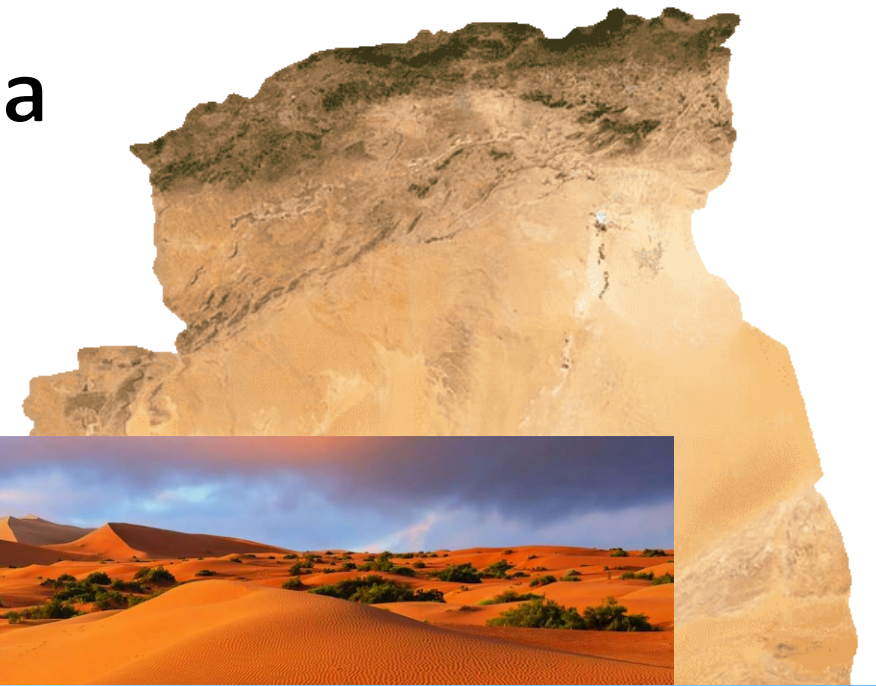
About **80% to 85%** of Algeria's total land area is part of the **Sahara Desert**

About **80% to 85%** of Algeria's total land area is part of the **Sahara Desert** and it is very diverse

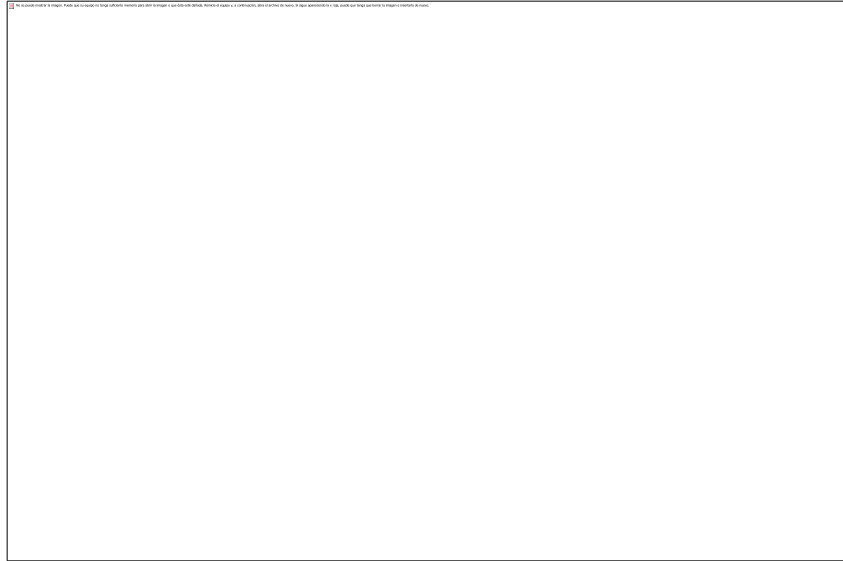
Life Conditions can become very Extreme in some places and during some Seasons:

Temperatures can exceed 50°C during the day and drop below -20°C at night.

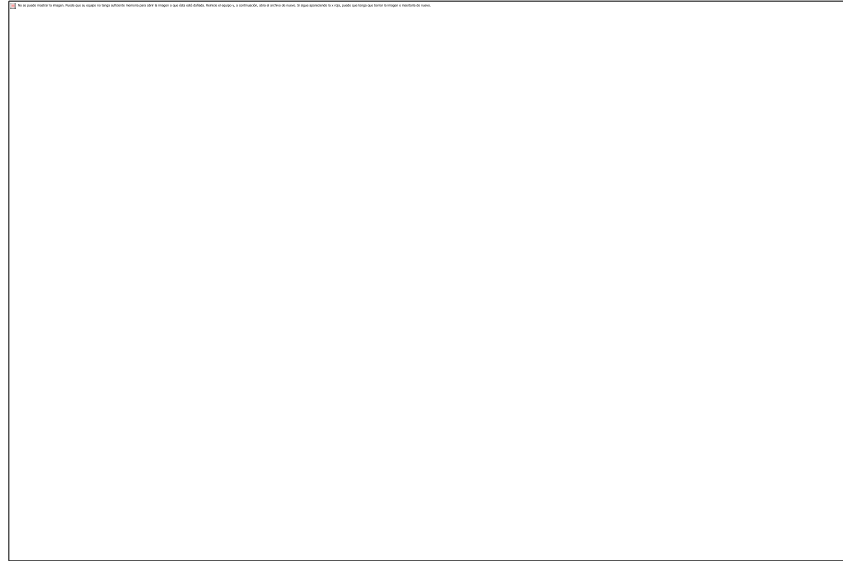
There is very little surface water, extreme dryness, strong UV radiation, and frequent sandstorms.



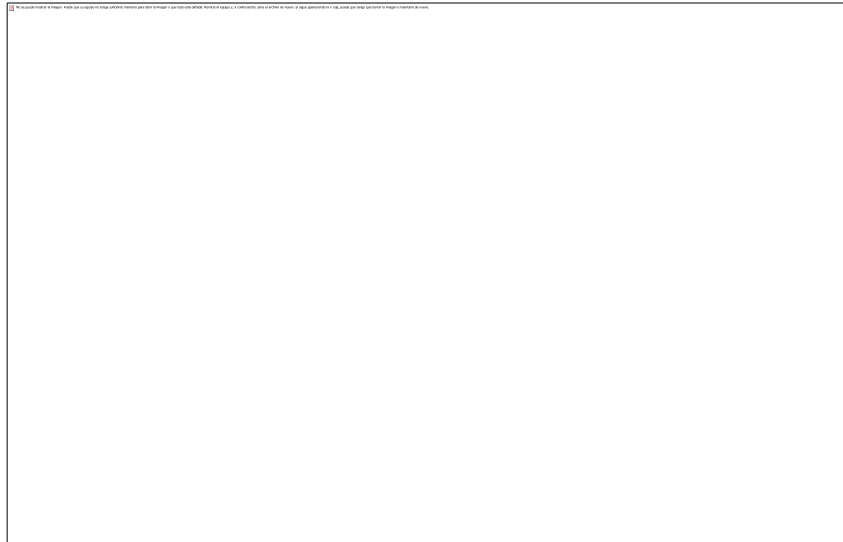
Despite these extreme conditions, life still exists.



Dromedary (Desert Camel)



Silver Ant



Scorpions

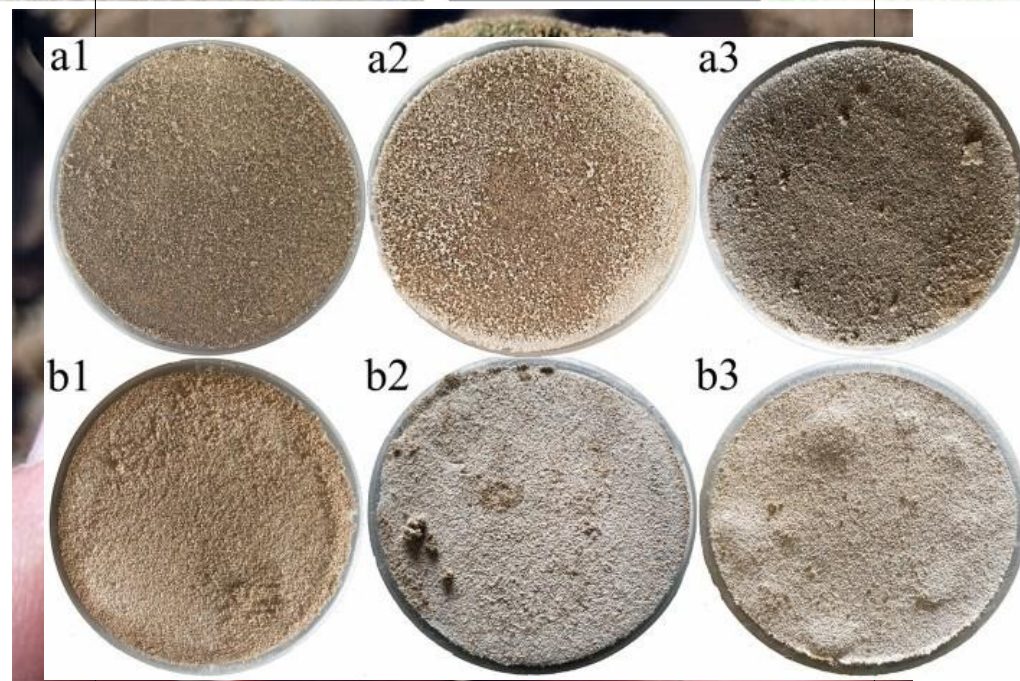
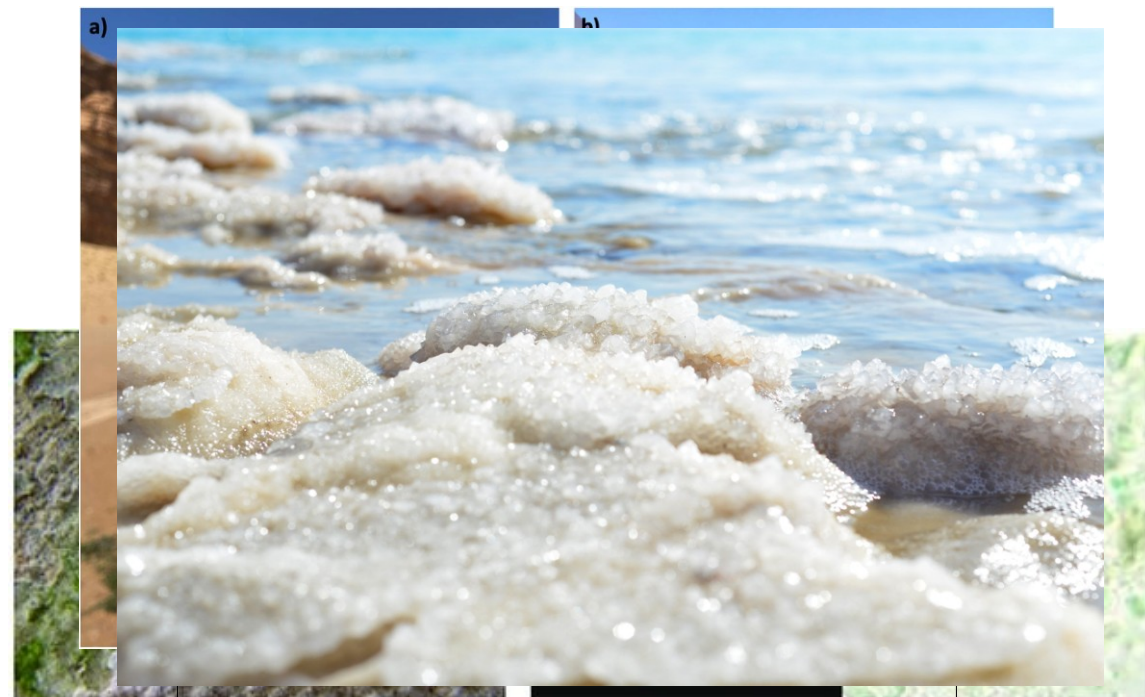


Reptiles

Microbial life

When we talk about life on exoplanets, we usually focus on microbial life, because it is likely much more common than complex life.

- Some, like endolithic cyanobacteria, live inside rocks to avoid radiation and heat
- Others can enter a dormant state in dry soils and reactivate when water appears.
- Some microbes, called halophiles, can survive in extremely salty environments.



A fish in the Sahara!!!!

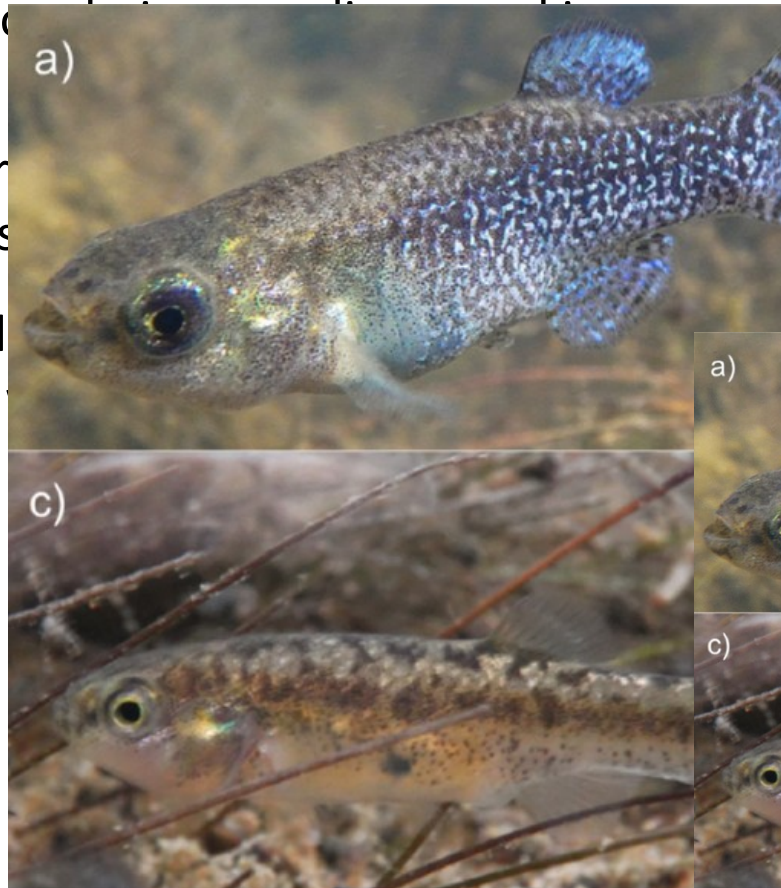
One of the most fascinating examples is a small fish: the Sahara killifish, *Apricaphanius saourensis*.

This species had not been observed in the wild for about 20 years and was considered possibly extinct.

But in June 2024, a large population was discovered in an isolated desert wadi.

This environment has intermittent water in some areas and disappears in others.

This discovery shows that life can exist in harsh environments, even when it is considered extinct.



BRIEF REPORT

Open Access



Potential rediscovery of the endemic critically endangered Sahara killifish (*Apricaphanius saourensis*) in Algeria

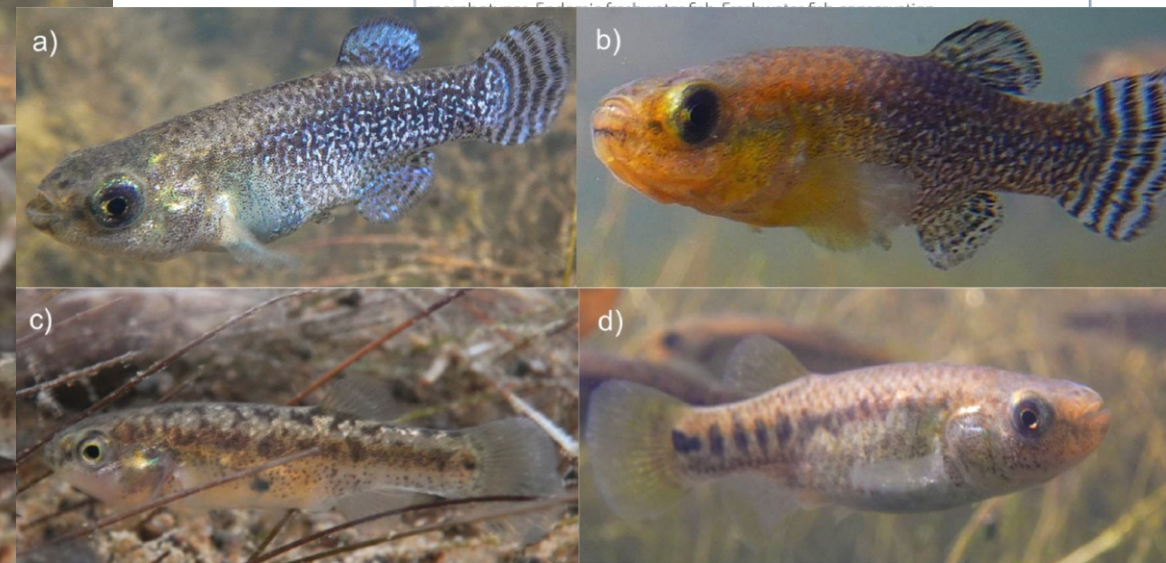
Redouane Tahri¹, Louiza Derouiche^{2*} and Carlos Rodríguez Fernandes^{3,4*}

*Correspondence: Louiza Derouiche derouiche@essaia.dz Carlos Rodríguez Fernandes cafernandes@fc.ul.pt
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³CE3C - Centre for Ecology, Evolution and Environmental Changes & CHANGE - Global Change and Sustainability Institute, Departamento de Biologia Animal, Faculdade de Ciências, Universidade de Lisboa, 1749-016 Lisboa, Portugal
⁴Faculdade de Psicologia, Universidade de Lisboa, Alameda da Universidade, 1649-013 Lisboa, Portugal

Abstract

Apricaphanius saourensis was described in 2006 from the Saoura River in western Algeria, the only known aphaniid in that region. Since then it has not been found in field surveys within the known geographic range, and the hypothesis that the species is possibly extinct in the wild has been raised. It has been recommended that further field surveys in the area should be conducted to clarify the conservation status of the species. Here we report the discovery of a significant aphaniid fish population in a very isolated wadi, approximately 115 km northwest of *A. saourensis*' type locality, which might belong to *A. saourensis* based on images taken of live individuals. Given the critically endangered status of *A. saourensis*, rather than handling or sampling individuals for analyses, we decided to start by obtaining images of living specimens from the population we discovered to compare the phenotypes with those described as diagnostic for the species. However, morphological and genetic analyses will be necessary to ascertain whether the population indeed belongs to *A. saourensis* or to a new species that has not yet been described.

Keywords *Aphanius saourensis*, Aphaniid, Possibly extinct in the wild, Colour

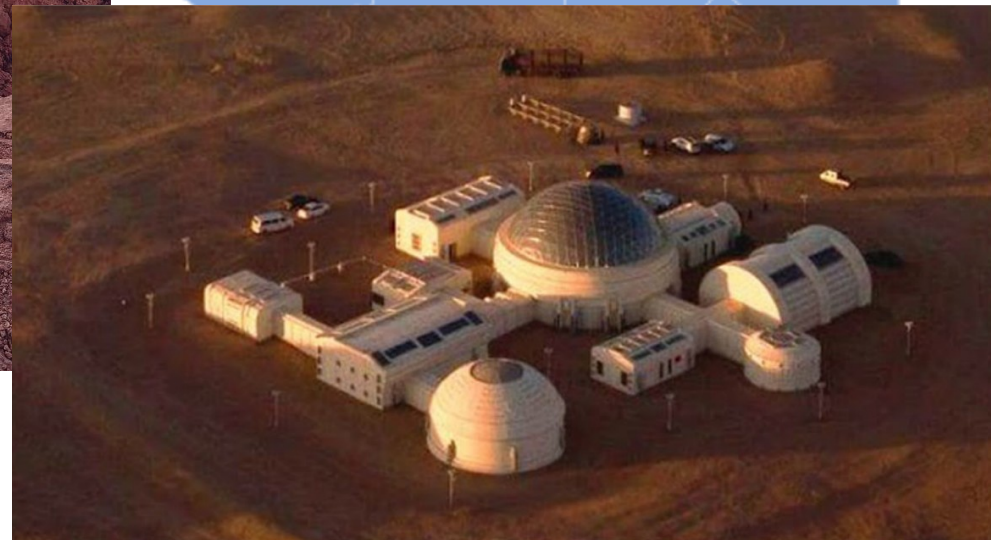
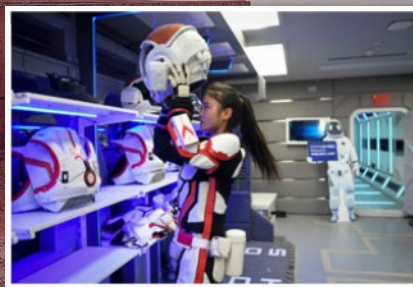
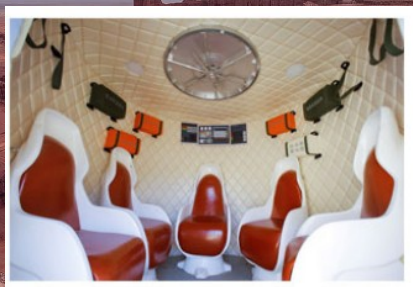
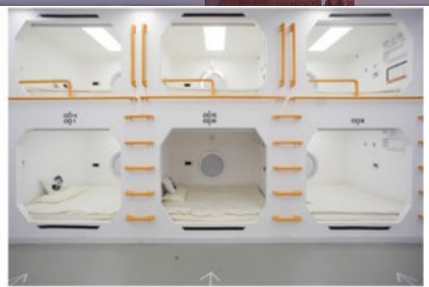
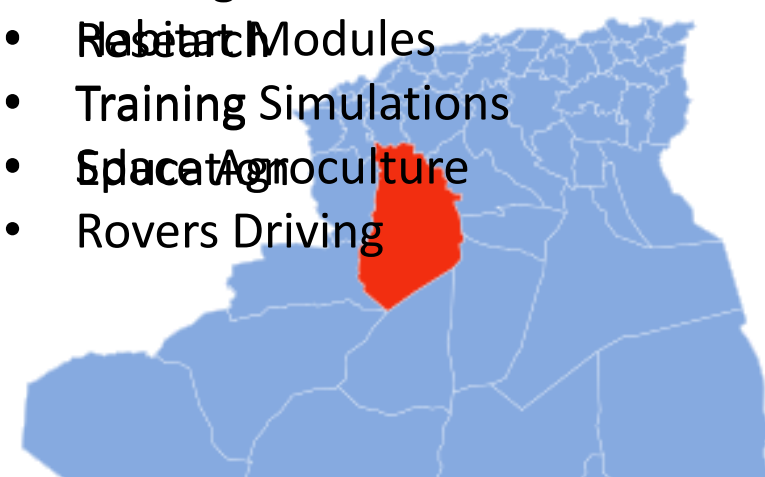


Tell Atlas Aerospace - Algeria



A lunar and Martian analog base in Algeria For:

- Habitat Modules
- Training Simulations
- Space Agriculture
- Rovers Driving



Thank you





Northern Winter - Life at Limits

S. Ekko, Finland

Photos and copyright S. Ekko



**Kiiruna
Rock Ptarmigan
Lagopus Mutus**



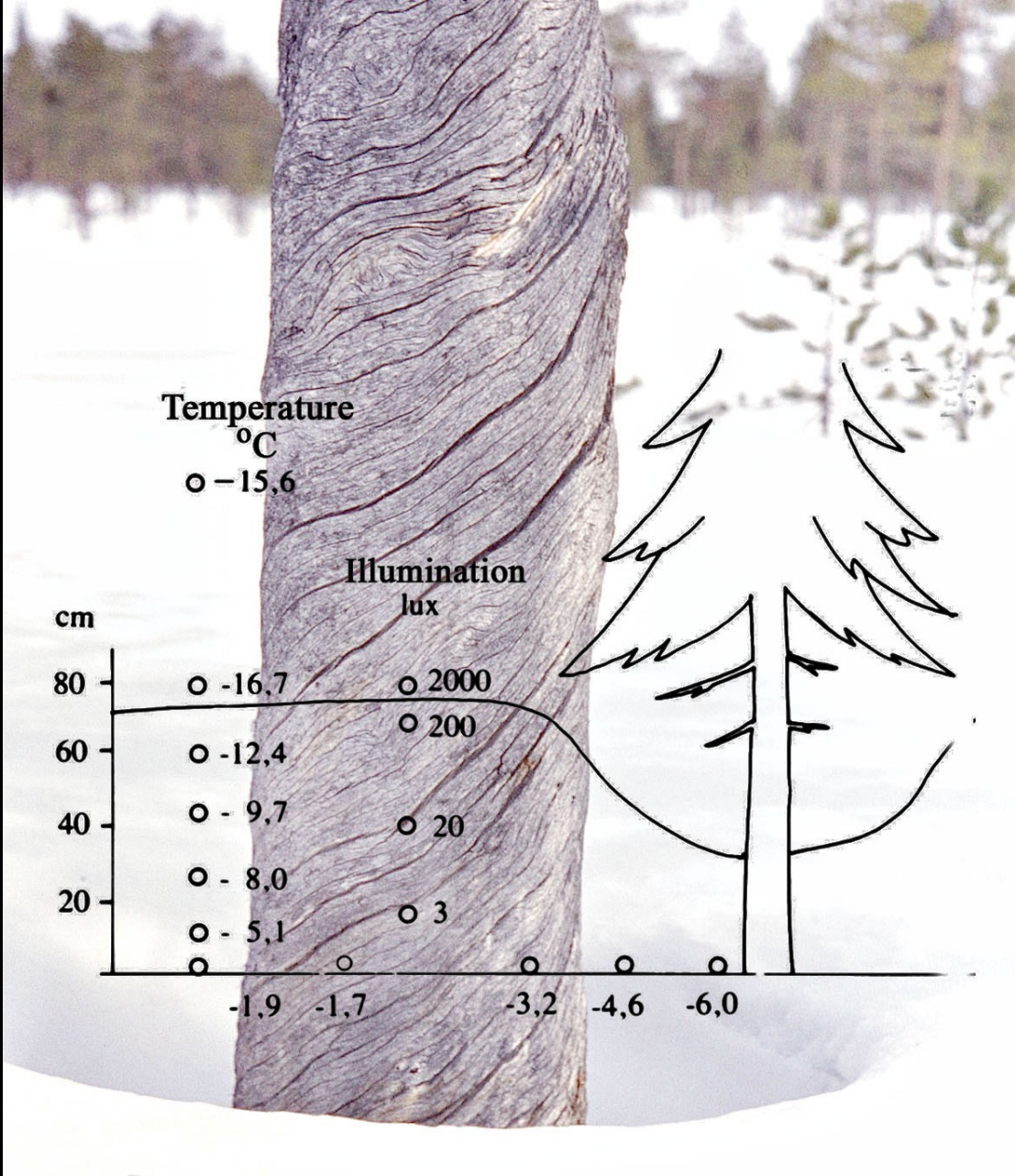
Winter

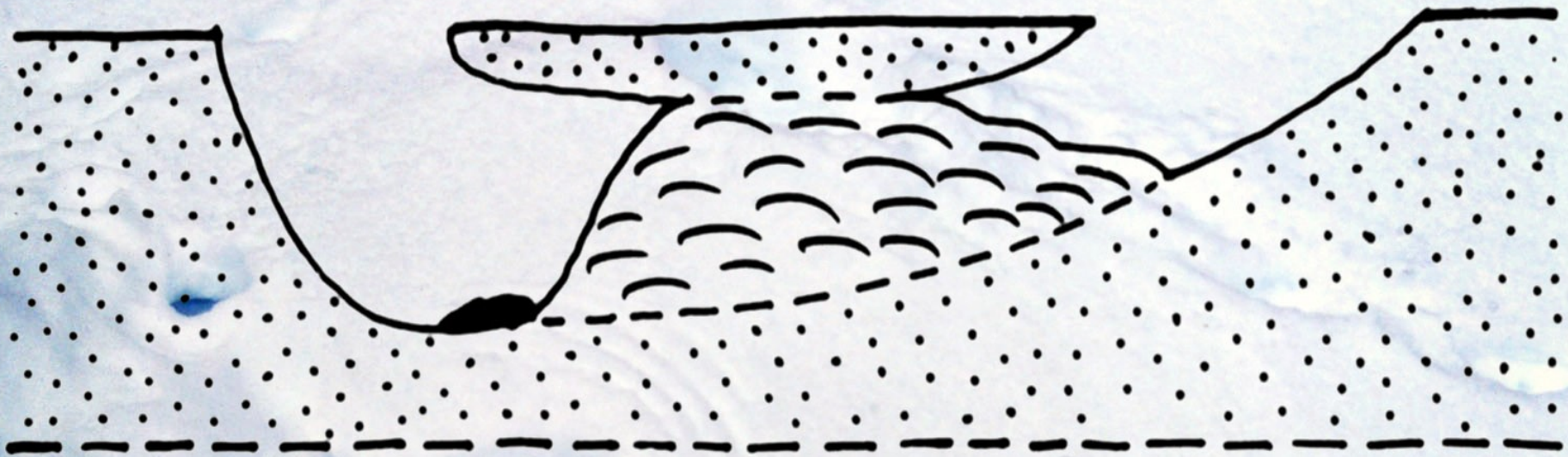


Summer







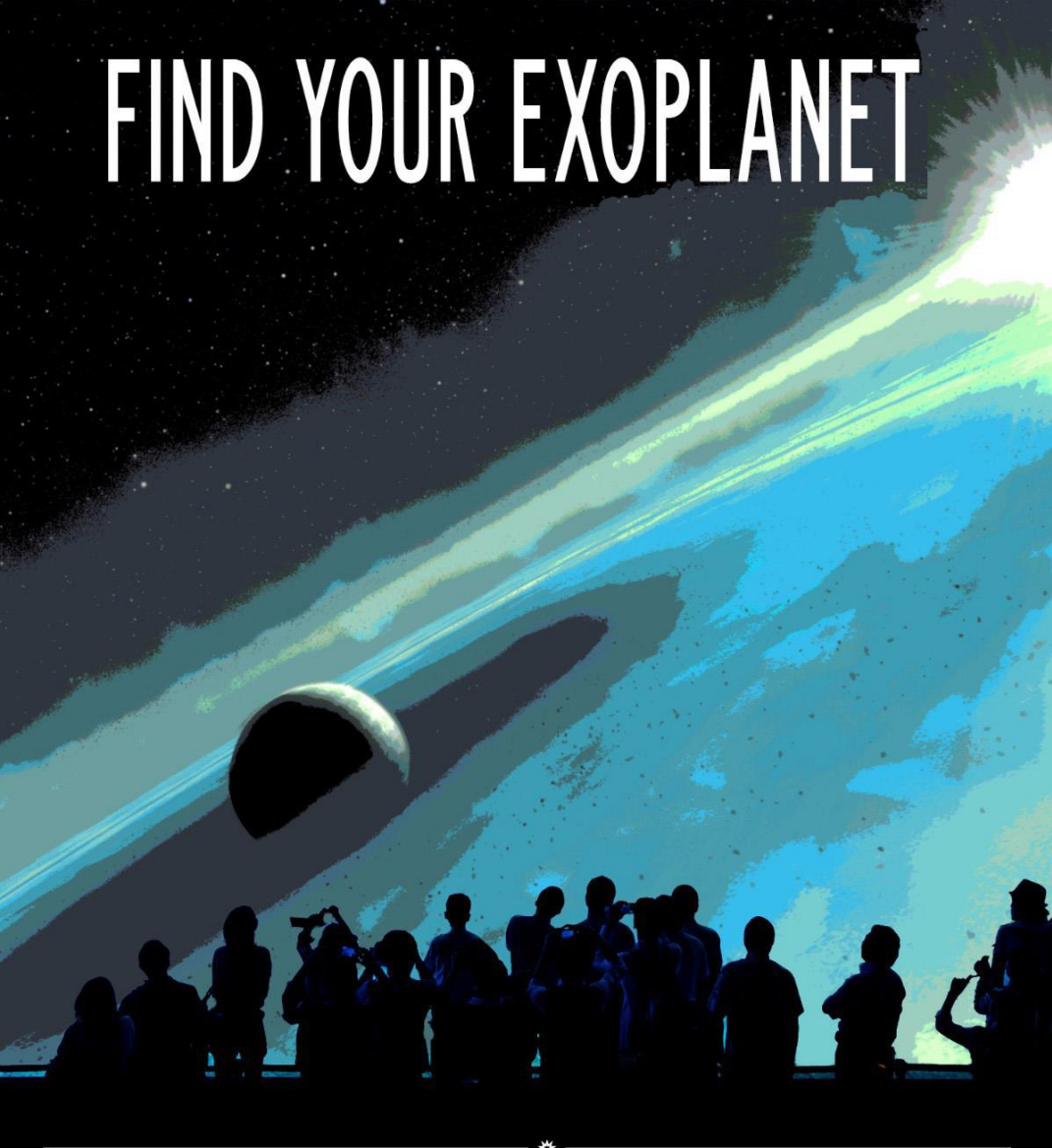






Thank you!

FIND YOUR EXOPLANET



NASE-UNESCO, INTERNATIONAL DAY OF LIGHT 2026

FROM MARCH 20 TO SEPTEMBER 22



Río Tinto: Mars on Earth

Fernando Ordóñez, SPAIN
March 28th, 2026



IBERIAN PIRYTIC BELT

- 250 x 90 km
- The largest concentration of massive sulfides in the world



PYRITE
(IRON SULFIDE)



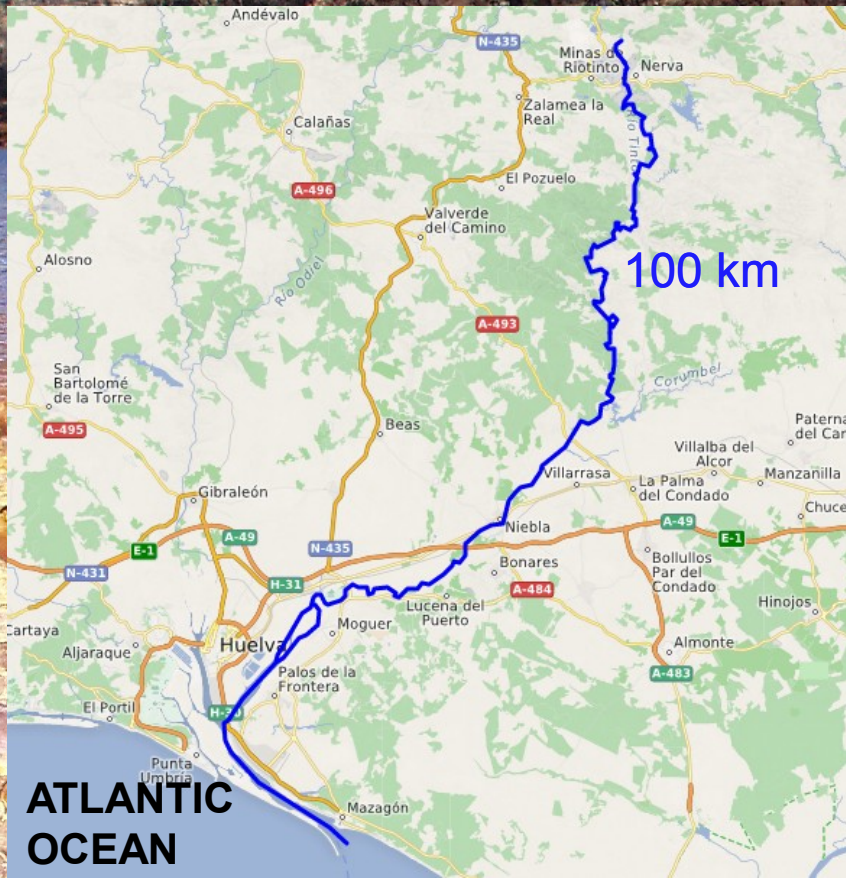
JAROSITE
(IRON SULFATE)



HEMATITE
(IRON OXIDE)

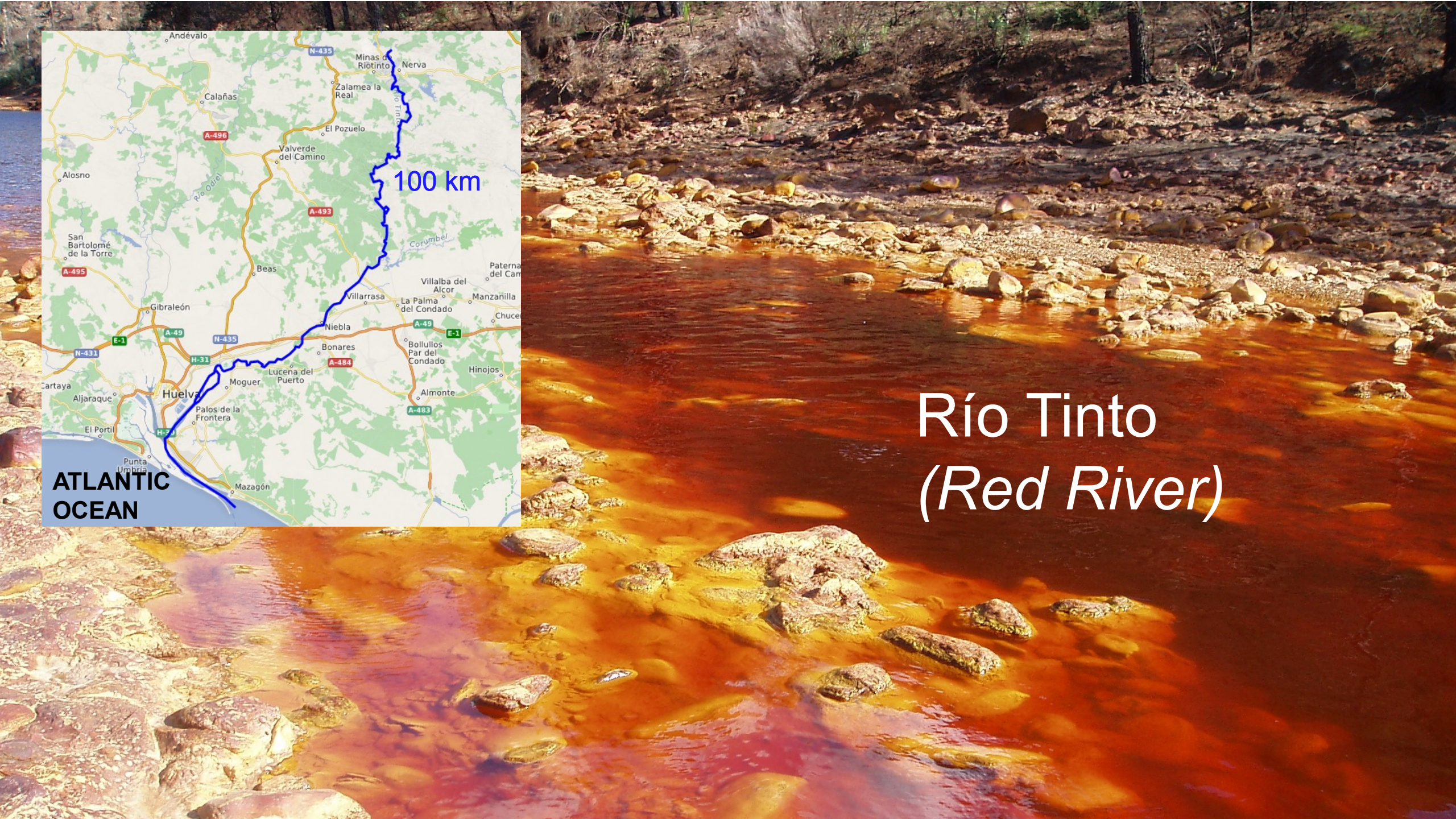
These mines have
been exploited since
Roman times until
today

Both have been
found on Mars!!!



**ATLANTIC
OCEAN**

Río Tinto *(Red River)*





- Extremely acidic water (pH = 2,3)
- High content in dissolved metals
- Anoxic sediments
- No fish, no amphibians, no birds...

... NO LIFE?

ASTROBIOLOGY CENTER (CAB)

Madrid, Spain

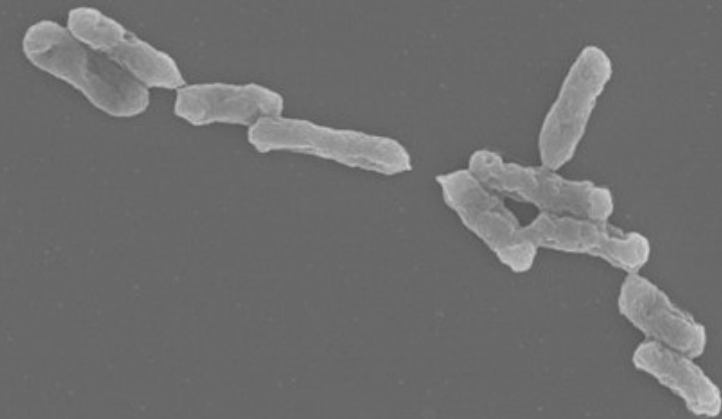


35 years of research on Río Tinto



Thriving bacteria: *Acidithiobacillus ferrooxidans*

- Chemolithotroph: “rock-eating” organisms
- No need for sunlight or oxygen
- Obtains energy from the oxidation of inorganic ferrous ion to ferric ($\text{Fe}^{2+} \rightarrow \text{Fe}^{3+}$).
- For millions of years it has modified the geology of the surrounding area



**Nature, not mining,
is responsible for this extreme environment.**

- There is life underground, without an atmosphere, under millions of tons of iron sulfide
- Now we know organisms that have modified the terrain and produced minerals similar to those found in Mars

Why wouldn't that be possible on Mars too?

Río Tinto, the best
geochemical and
mineralogical
analogue for Mars



NASA, ESA and other institutions have been conducting research and tests related to Mars exploration

Río Tinto has been a test bench for equipment and life detectors that will later operate on Mars





Today, “Mars on Earth” is a circuit that allows visitors to discover the similarities between this corner of Spain and the Red Planet



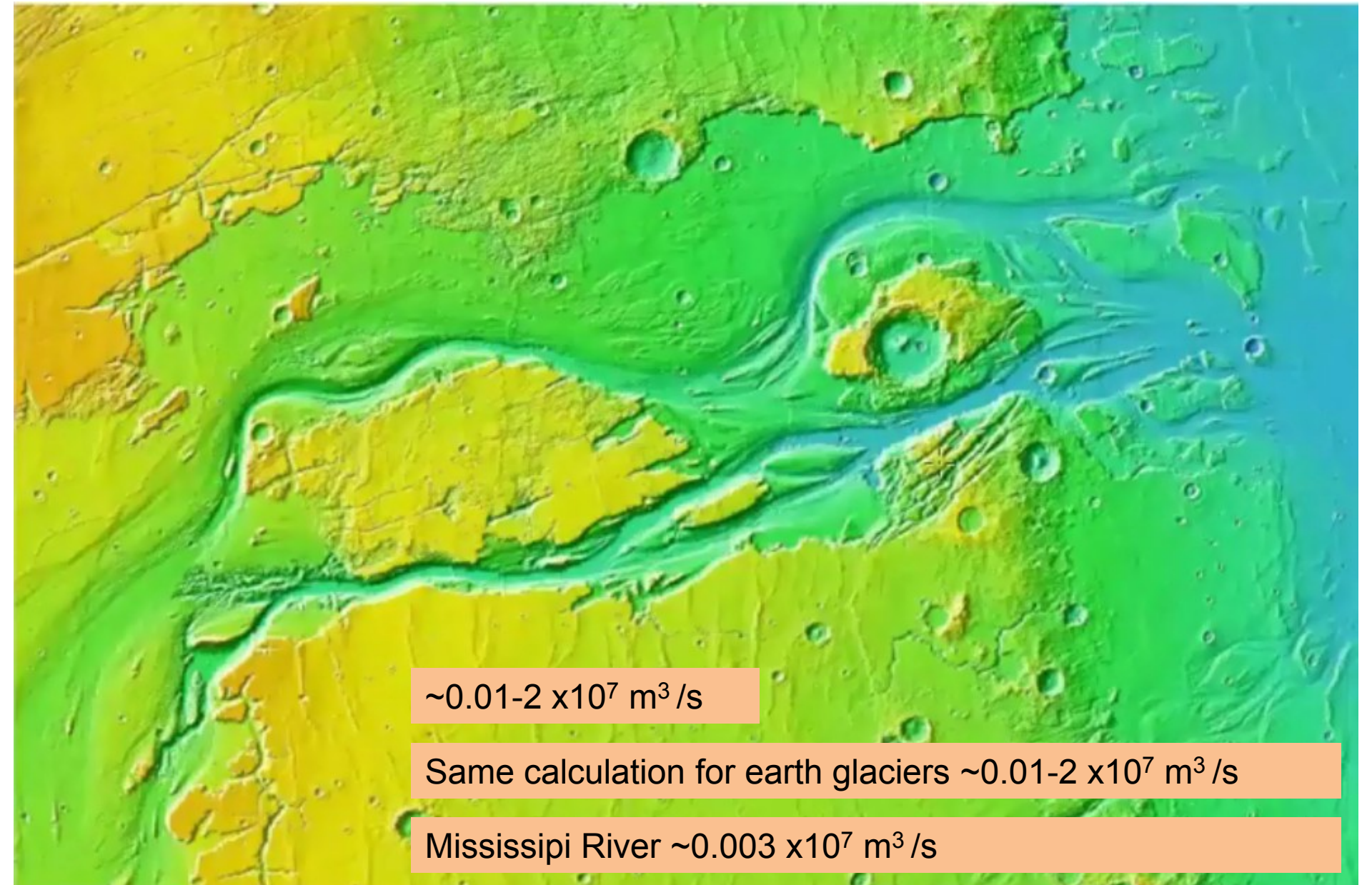
LIQUID WATER ON MARS

**Alejandro Saravia
NASE - HONDURAS**

Mars







$\sim 0.01 - 2 \times 10^7 \text{ m}^3/\text{s}$

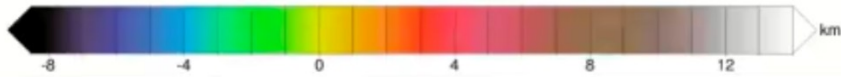
Same calculation for earth glaciers $\sim 0.01 - 2 \times 10^7 \text{ m}^3/\text{s}$

Mississippi River $\sim 0.003 \times 10^7 \text{ m}^3/\text{s}$

290°

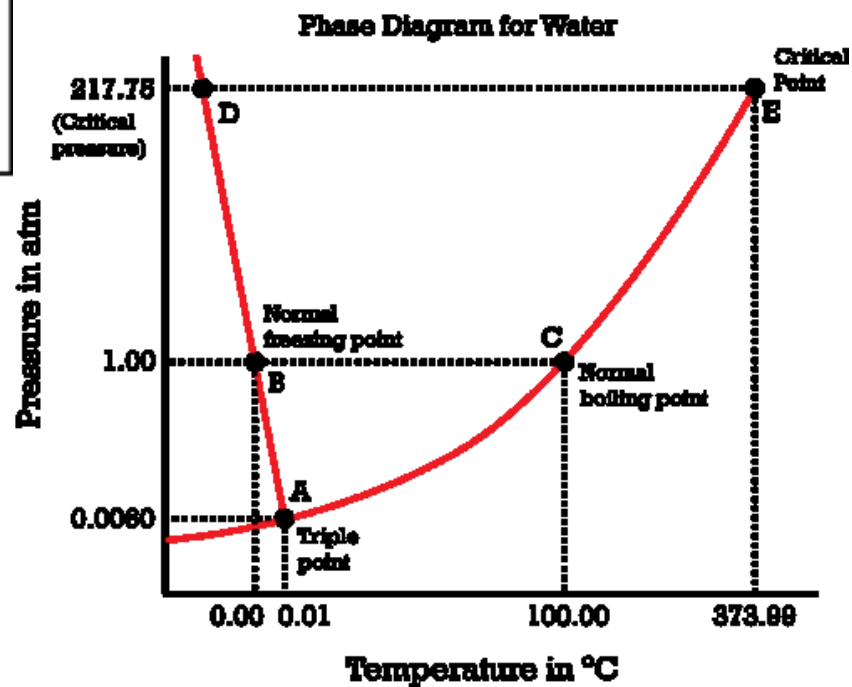
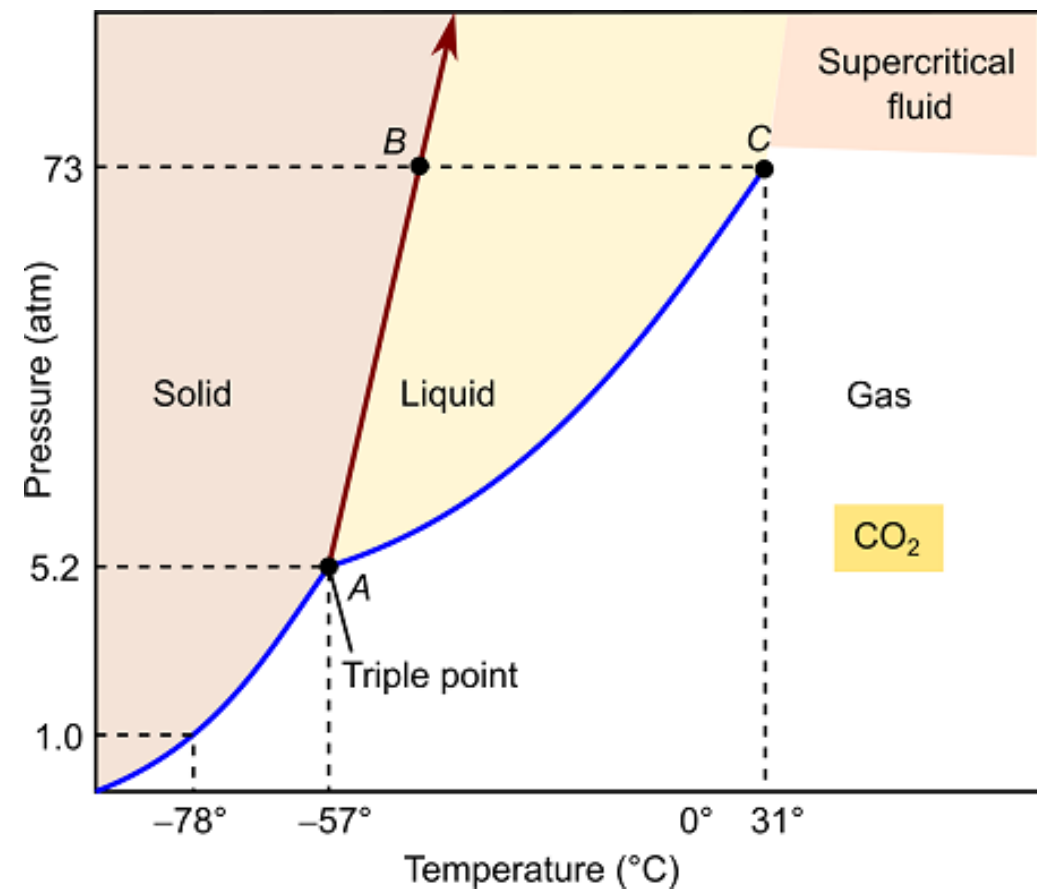
300°

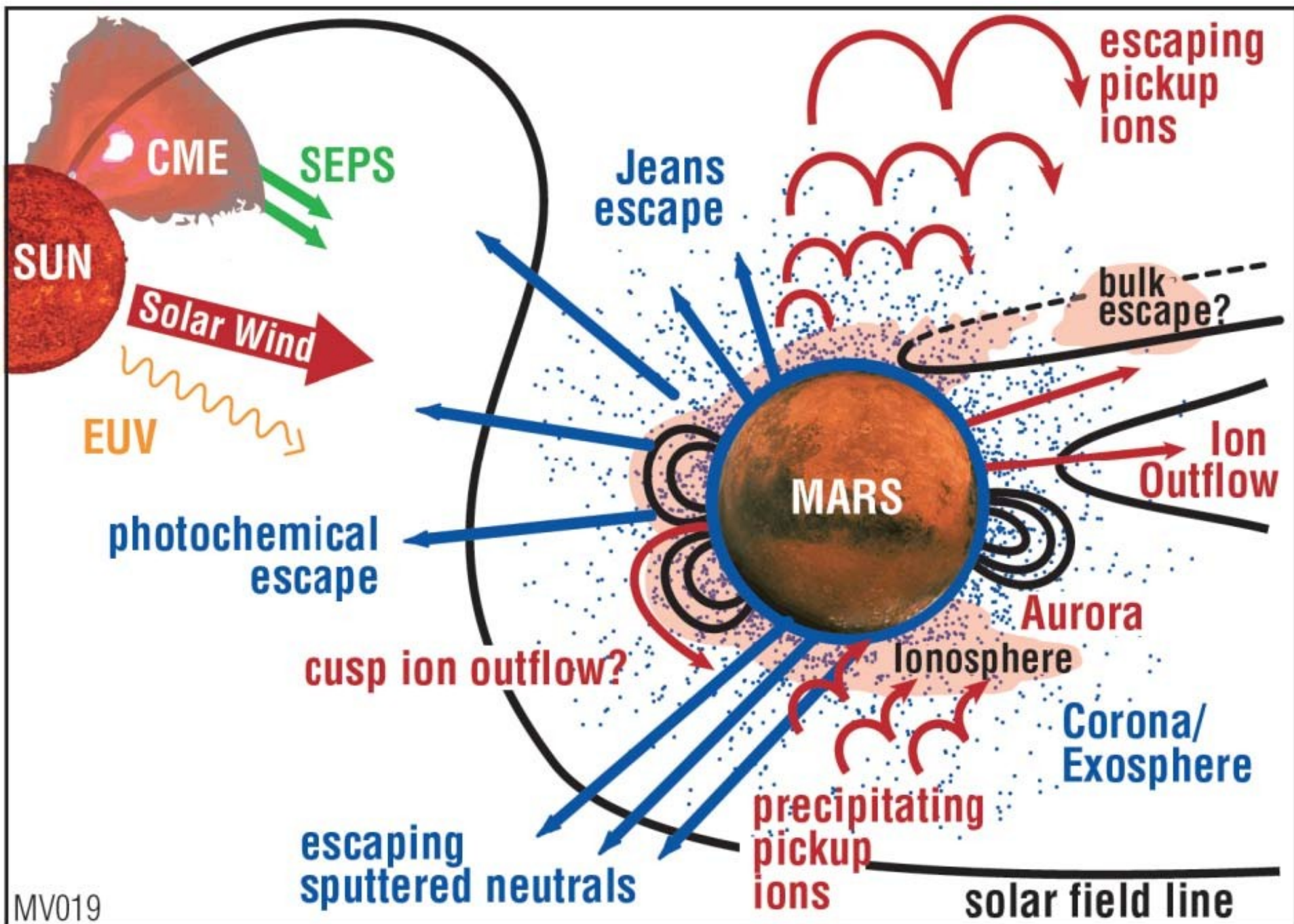
310°





Phoenix Mars Lander, 2008







Hot water at 80 C inside the syringe

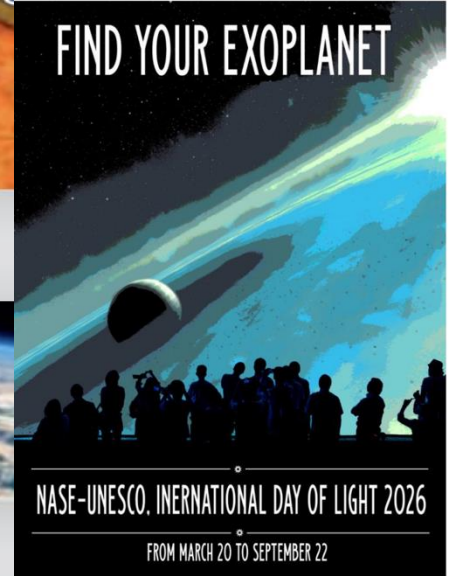
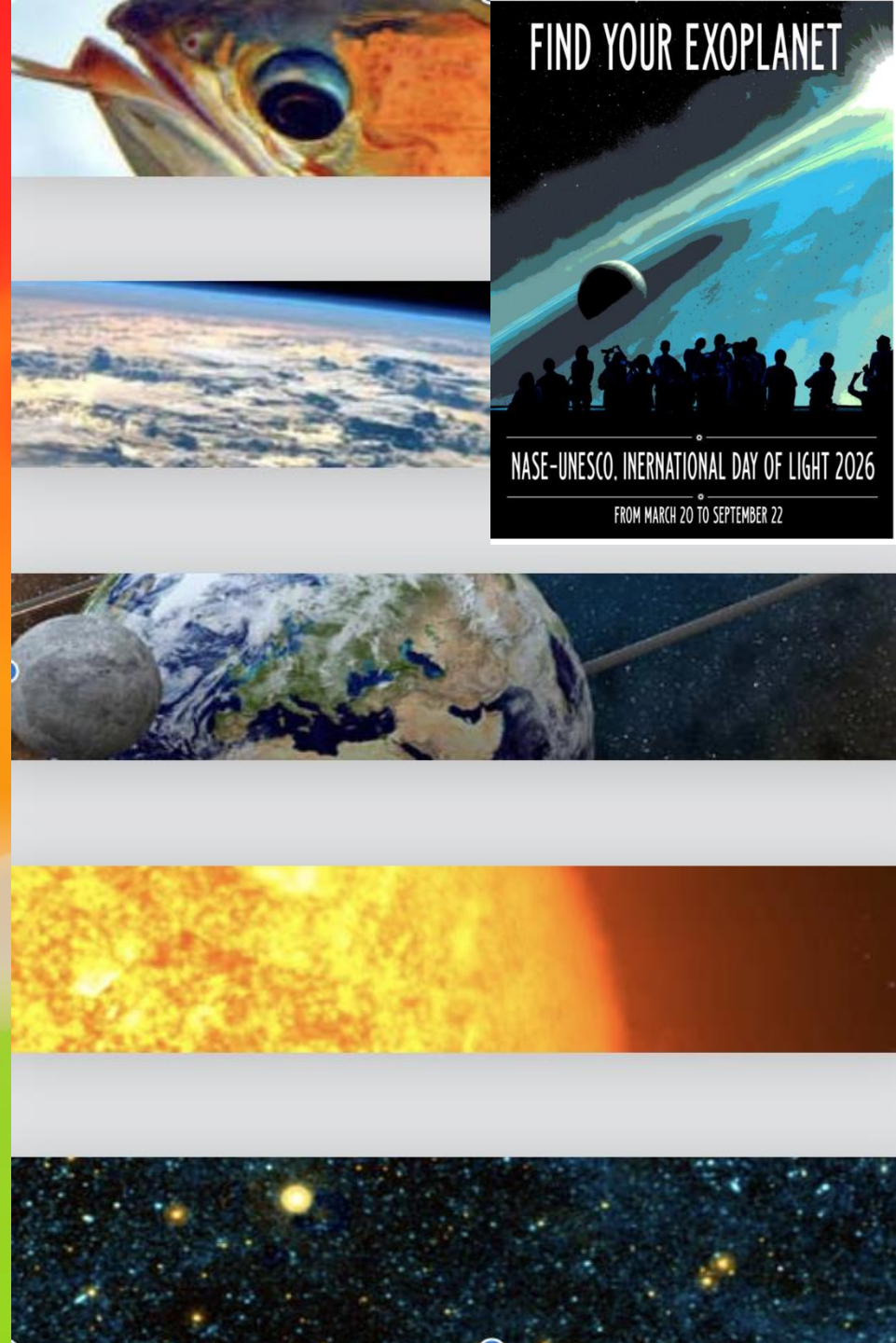


Reducing the interior pressure would cause water to boil even below 100 C.

Life in extreme conditions, in search of a second Earth!

Dr Margarita Metaxa

**NOC for Greece
OAO, IAU**

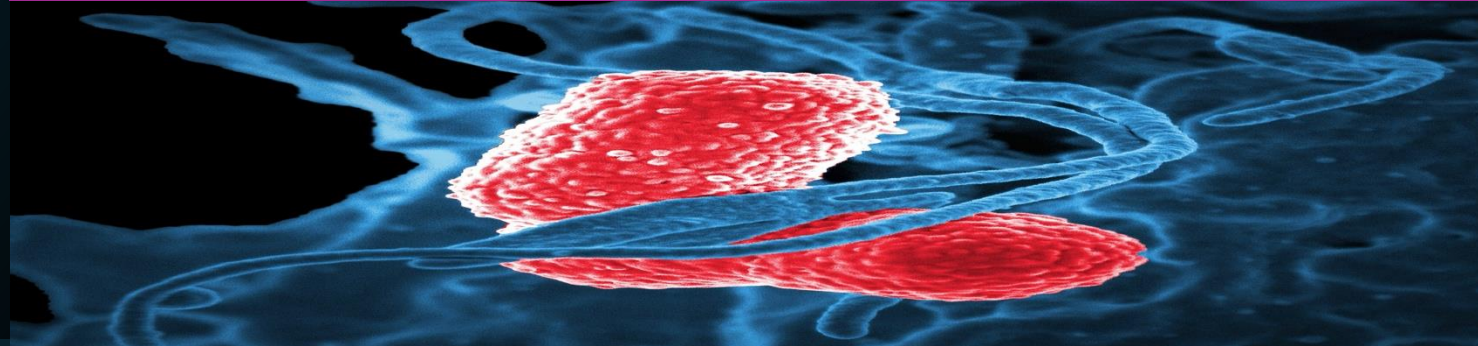


Core questions

How does life begin and evolve?



Does life exist elsewhere than Earth?



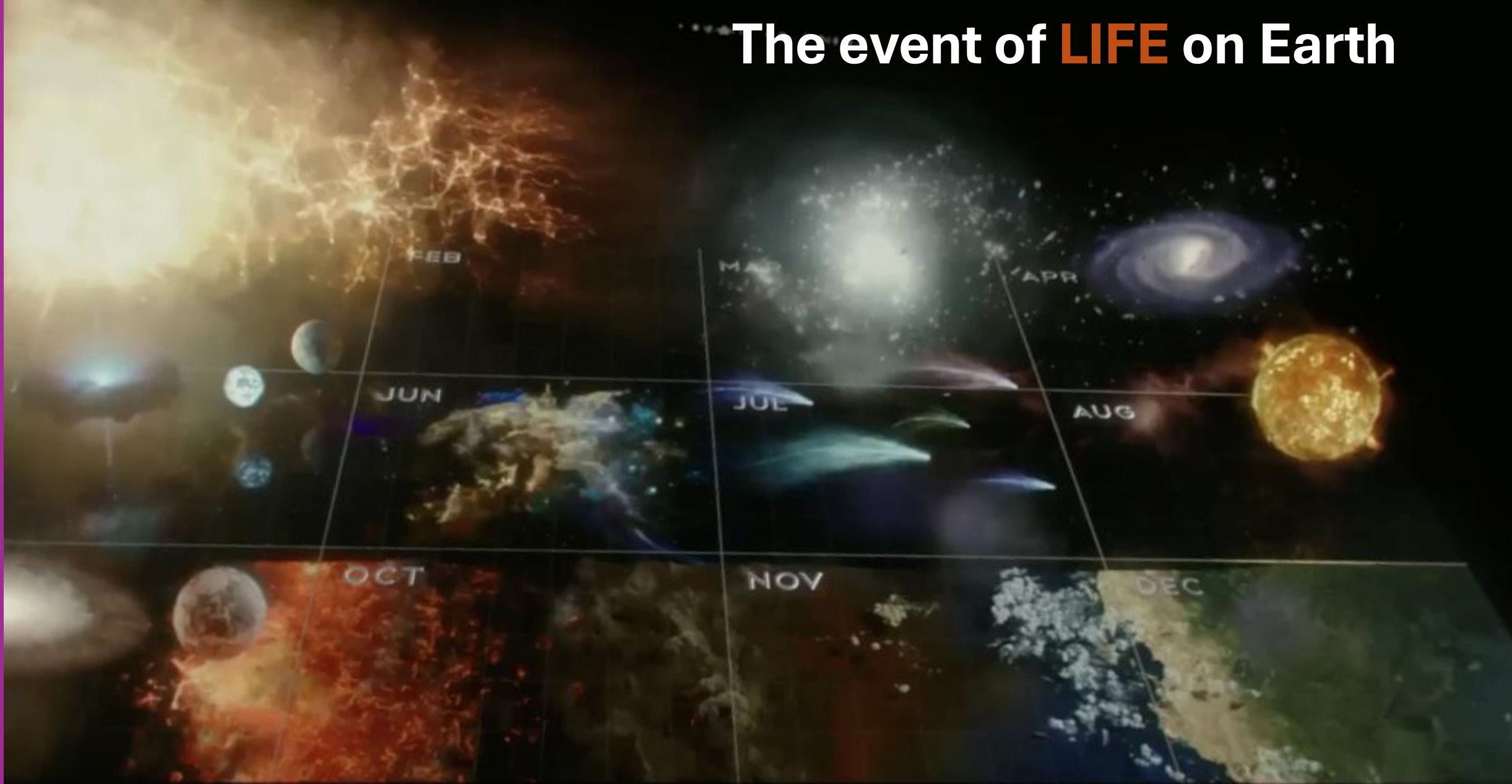
How can we find life in the Universe?



Astrobiology

**is an interdisciplinary
scientific field**

The event of **LIFE** on Earth



How did life begin and evolve on Earth?

Looking in moons of other planets

Does life exist elsewhere?

Europa Icy moon (Δίας)

A global
subsurface
ocean
beneath the ice

Enceladus Icy moon (Κρόνος)

Water, Salts,
**Organic
molecules,**
Hydrogen gas
(H_2) → strong
evidence for
hydrothermal
vents

Titan

Λίμνες υδρογονανθράκου
(Κρόνος)

**Rich in organic
molecules**

**Complex prebiotic
chemistry in the
atmosphere**

👉 **Titan may
resemble early Earth
before life began.**



THE THANK YOU!! NUES

*«to explore strange new worlds,
to seek out new life and new civilizations,
to boldly go where no man has gone before»*

Star Trek, 1966-1969

FIND YOUR EXOPLANET



NASA-UNESCO. INTERNATIONAL DAY OF LIFESCIENCE

FROM MARCH 20 TO SEPTEMBER 22.