Online Certificate Course in Astrobiology & Paleontology | 225 -7 | 2025 | BATCH 07

COURSE TYPE: Short Certificate | MODE: Online/ Distance learning |

DURATION: 5 Months/ Each Saturday 6.30pm to 8.30pm [IST]

START: 1st of November 2025 | Application DEADLINE: 23rd of October 2025

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Importance of Studying Astrobiology and Paleontology

Astrobiology and paleontology are two interconnected scientific disciplines that contribute to our understanding of life's origins, evolution, and potential existence beyond Earth. Astrobiology investigates the conditions necessary for life to emerge and persist in the universe, examining planetary habitability, biosignatures, and extremophiles as analogs for extraterrestrial life. Meanwhile, paleontology focuses on Earth's fossil record, reconstructing the history of life and the environmental factors that shaped its development over billions of years. The study of astrobiology is essential for assessing the possibility of life beyond Earth, guiding space exploration missions, and refining our understanding of planetary systems and their potential for habitability. It integrates knowledge from biology, chemistry, planetary science, and astronomy to explore fundamental questions about life's existence elsewhere in the cosmos. Similarly, paleontology provides critical insights into the history of life on Earth, revealing patterns of evolution, mass extinctions, and survival strategies that inform our search for life in extreme environments, both on our planet and on other celestial bodies. By combining insights from both fields, scientists can develop models to predict where and how life might exist beyond Earth. Studying ancient microbial fossils (such as stromatolites) helps refine techniques for identifying biosignatures on Mars and icy moons like Europa and Enceladus. Understanding past extinction events on Earth also aids in recognizing planetary conditions that may be conducive or hostile to sustaining life elsewhere. Overall, the interdisciplinary study of astrobiology and paleontology enhances our knowledge of life's potential in the universe while deepening our appreciation for Earth's biological history. As space exploration advances, these fields will continue to play a crucial role in answering fundamental questions about our place in the cosmos.

Course Overview

The Online Certificate Course in Astrobiology, Paleontology, and Multidisciplinary Astronomy, introduced by Eco Astronomy Inc. – International Hub, is an interdisciplinary program designed to enhance awareness and outreach in these fields. The course integrates principles of paleontology, geology, and astrobiology, fostering a comprehensive understanding of Earth's biological and geological past while also exploring extraterrestrial environments for signs of life. Through expert-led lectures and interactive discussions, students will examine both Earth's fossil record and the potential for life beyond Earth, gaining insight into how these domains inform each other. This program emphasizes the connections between ancient life on Earth and the conditions required for life in the cosmos, preparing participants to think critically about astrobiological exploration and paleontological research in a multidisciplinary context.

Professional Importance

Astrobiology and paleontology expertise is increasingly relevant in modern science and space exploration. Professionals equipped with knowledge in these areas can contribute significantly to missions and research that probe the unknown, from analyzing Mars rock samples to interpreting the fossil record. This certification provides several professional benefits for participants:

1. **Interdisciplinary Knowledge Integration:** Bridges the gap between astronomy, biology, geology, and paleontology, providing a holistic understanding of life's origins, evolution, and potential existence beyond Earth.

2. **Career Advancement in Emerging Fields**: With growing interest in space exploration (e.g. NASA's Artemis lunar missions, Mars rover discoveries, and exoplanet research), expertise in astrobiology and multidisciplinary astronomy positions professionals in science, education, and research to engage in cutting-edge projects.

3**.Enhanced Research and Academic Competence:** Prepares researchers, educators, and

students to contribute meaningfully to astrobiological studies, fossil analysis, and astronomical discoveries by equipping them with up-to-date methodologies and conceptual frameworks. Public Outreach and Science Communication: Equips science communicators, museum curators, and educators with the knowledge to explain complex astrobiology and paleontology concepts to diverse audiences, thereby improving science literacy and public enthusiasm for these fields.

4.Supporting Space Industry and Policy Development: Provides foundational insights for

professionals in space agencies, policy-making bodies, and the private aerospace sector regarding the search for extraterrestrial life and planetary habitability. This knowledge caniniform mission planning, astrobiology-related policy, and commercial space endeavors.

5. Supporting Geo Tourism, Paleo Tourism Pantological conservation in Sri Lanka.

6. Networking with international expertise

Course Objectives

By the end of this course, students will be able to:

Understand the Origins and Evolution of Life: Explain the conditions necessary for life, from early Earth to exoplanetary environments, and discuss how fossil records trace the evolutionary history of life on Earth.

Examine Astrobiological Research Methodologies: Describe extremophiles and biosignatures, and apply techniques used in detecting life beyond Earth (e.g. spectroscopic analysis of planetary atmospheres, rover-based life detection experiments).

Analyze Paleontological and Geological Evidence: Interpret fossil records and stratigraphic layers to understand past life forms and environmental changes on Earth, and relate these patterns to potential extraterrestrial analogs.

Apply Multidisciplinary Astronomy Concepts: Integrate knowledge of astrophysics, planetary science, and astrogeology to assess habitable zones, interpret exoplanet discovery data, and evaluate planetary geology (especially Mars and icy moons) for signs of past or present life.

Develop Critical Thinking and Research Skills: Engage in case studies and scientific debates on topics such as panspermia (life's potential interplanetary spread), mass extinction events, and the Fermi Paradox, using data interpretation and evidence-based reasoning.

Enhance Science Communication: Present astrobiological and paleontological findings in written and oral formats suitable for both academic audiences and the general public, demonstrating effective science communication techniques.

Prepare for Advanced Studies and Careers: Build a strong foundation for further research or careers in space science, astrobiology, paleontology, science education, science journalism, or museum curation, with the ability to initiate and contribute to projects in these domains.

Course Modules (Curriculum Outline)

The course is organized into modules covering key topics in astrobiology, paleontology, and related disciplines. Below is a breakdown of each module with the number of lectures and instructors:

1.Essentials of Astrobiology, Paleontology and Multidisciplinary Astronomy Application (4 lectures) | **Assignment 01**

An introduction to the course and its interdisciplinary nature. This module provides a broad overview of how astrobiology and paleontology intersect with astronomy and geology. Students will be introduced to core concepts and case studies that illustrate the combined application of these fields in understanding life and the universe.

2.An Introduction to Astrobiology and its Connectivity with Paleontology | (3 lectures)

Investigates the biological and chemical processes that connect ancient Earth with potential extraterrestrial life. Topics include the chemistry of life's building blocks, early Earth environments versus other planetary environments, and how fossils (e.g. microbial mats and stromatolites) guide our search for life on Mars and beyond.

3. An Introduction to Universe and star formation, element formation and volatile elements (3 lectures) |

4. Solar system, formation, planetary geology and Geology of Earth (3 lectures) |

5.History and Theoretical Foundations of Paleontology and Geology (3 lectures) |

Analyzes the historical development and fundamental principles of Earth's geological and biological evolution. Students will learn about the geological time scale, plate tectonics, evolution of life through different eras, and key theorists and discoveries that shaped paleontology and geology as sciences.

6. Using AI/ML for Space Biology Research | Astrobiology Application | **Certificate 01**

7. An Introduction to Fossils, Fossilization, Preservation Methods and applied equipment (5 lectures) |

This comprehensive module is divided into several subtopics, reflecting the breadth of paleontology: *Fossil Formation and Diagenesis:* Understanding how fossils form, the processes of fossilization, and the chemical/physical changes (diagenesis) that occur over time leading to long-term preservation of biological material. *Fossil Preservation on Earth:* Examining Earth's diverse fossil records (with examples from various regions) and their significance in reconstructing past environments and evolutionary studies. Special attention is given to exceptional preservation cases (Lagerstätten) and what they tell us about ancient ecosystems. *Fossils, Minerals, and Commercial Applications:* Assessing the economic and scientific value of fossils and minerals in industry and research. This includes discussions on fossil collecting, ethical considerations, and how mineral deposits often co-occur with fossil sites (e.g. oil exploration's links to microfossils). *Advanced Analysis of Invertebrate and Ichnological Fossils:* Studying invertebrate fossils and trace fossils (ichnofossils such as footprints, burrows, etc.) to infer behavior and environmental conditions of ancient life. Techniques for analyzing these fossils and what they reveal about ancient ecosystems are covered.

8. An Introduction to Planetary Analogs and simulation (4 lectures)

Features a series of expert guest lectures focusing on terrestrial analog environments that simulate extraterrestrial conditions. Students will learn how extreme Earth environments (deserts, deep sea vents, Antarctica's dry valleys, salt flats, etc.) are used as *analogs* to study Mars-like and other planetary conditions. The module also delves into planetary geology fundamentals – reviewing surface features of Mars, moon geology, and methodologies for conducting field research in analog sites to prepare for actual space missions.

9. Biotechnology Beyond Earth: Innovations for Space Exploration | Applications of Food Sciences (3 lectures) |

Explores cutting-edge biotechnological advancements that support life and resource utilization in space. Topics include life support systems (bioregenerative life support using plants and microbes), bioengineering for astronaut health, developing sustainable food production in space (astrobotany and cultured foods), and using microbes for in-situ resource utilization (e.g. biomining on asteroids or Mars). Students will discuss how biotechnology can address challenges of long-duration missions and planetary habitats.

10. An essential of geology of Mars (3 lectures) |

A focused look at Mars and Earth comparative planetology, combined into a single module with three interconnected parts: *Martian Geology & Landscape Traces:* Exploring the surface geology of Mars, including volcanic features, canyons (like Valles Marineris), and especially sedimentary structures that provide evidence for past water activity. Students will examine Mars rover findings (rock stratigraphy, minerals like hematite concretions) that hint at Mars' habitable past. *Meteorite, Mineral, and Rock Identification:* Introduction to identifying extraterrestrial geological materials. This includes classification of meteorites (chondrites, achondrites, etc.), recognizing minerals and rock types both on Earth and in samples from the Moon/Mars, and using microscopic and spectral techniques to analyze rock compositions. *Astro-ecology and Earth Observation from Space:* Analyzing Earth's biosphere through remote sensing and what that teaches us about detecting life signals on other planets. This part covers Earth observation satellites, climate and vegetation indices, and how features like atmospheric composition or surface biosignatures seen from space could be applied in searching for life on
exoplanets.

11. An essential of Paleontology and Fossils of Sri Lanka, Applications and Innovations. (5 lectures) |

Examines the unique paleontological heritage of Sri Lanka (and the South Asian region by extension). Students will learn about Sri Lanka's fossil sites, such as the Sabaragamuwa Basin known for Quaternary period fossils. Additionally, Sri Lanka consisted with Jurassic and Miocene fossil facts. The module also covers paleoenvironment reconstruction of the area, local fossil conservation
efforts, and the significance of these fossils in the broader context of Gondwana and the ancient
supercontinents.

12. Applied Information Technology and Coding for Astronomy & Space Science (3 lectures) | **Assignment 02**

Introduces how information technology is applied in astronomy and space science research. Topics include the basics of astronomical data analysis, programming (in Python or MATLAB, for example) for handling data from telescopes and space missions, simulation tools for astrobiology (such as climate modeling of exoplanets or orbital mechanics), and an overview of software used by scientists for data visualization.
Students will also get a primer on coding practices, data science, and possibly a hands-on mini-project like analyzing a small dataset (e.g. exoplanet database or fossil dataset).

13. Developing Academic Projects, Innovations, and the Space Science Market | (5 lectures) | Career Guidance and Counseling (2 lectures) | **Viva presentation.**

Focuses on the intersection of science, entrepreneurship, and innovation. Students will learn how to develop academic or citizen-science projects in astrobiology and paleontology, how to write proposals or business plans for science-based initiatives, and explore the growing industrial market around space science (such as private space companies, educational tech, and scientific tourism). The module covers innovation case

studies, translational research (turning research into products or startups), and guidance on securing funding or partnerships for science projects.

How To Achieve Your Certificate

1. A minimum of 80% attendance is required for course lectures.
2. Completion of a short assignments report in accordance with the instructions provided by the course coordinator. 20% [A]
3. Completed the PowerPoint presentation in accordance with the guidelines provided by the course coordinator. 20% [B]
4. Using AI/ML for Space Biology Research | Open Science Data Repository by NASA 20% [C]
5. Fossils of Sri Lanka practical workshop 20% [D]
6. Completion of the open-book test as the final online examination. 20 % [E]

A + B+ C+ D + E = 100 %

Range of Mark	Letter of Grade
95- 100	A^+
90 -94	A
89- 85	A^-
84-80	B^+
79-75	B
74-70	B^-
69-65	C
64-60	S
Less than 59	F

To foster an engaging and interactive learning environment, all students are expected to actively participate in the Q&A discussion at the end of each lecture. Your involvement is essential for deepening understanding and promoting collaborative learning. Eco Astronomy's Academic Counselor, Eng. Majda Aouititen, will be monitoring student participation, soft skills, and professional behavior throughout the course. This assessment ensures continuous development and academic excellence. We encourage every student to contribute thoughtfully and make the most of these discussions.

Entry Requirements

This Online certificate course is designed for **students aged 8 to 30** who have a keen interest in these scientific domains. Tailored for beginners, the program introduces fundamental concepts, fostering curiosity about the search for extraterrestrial life and the fossil record of ancient organisms. Due to limited availability, only the first 50 applicants will be selected, ensuring an engaging and focused learning experience.




Course Fee

Included - Tuition Fee, Examination Fee, Practical fee. Certification fee]

Full course Payment: **25,000 LKR**

Option 01 - One time Pay**:** The course fee is [25,000LKR]
Option 02 - If you are unable to make the full payment upfront, you have the option to pay in installments. The total fee can be divided into 3 stages:

- **1st Installment:** 7,500LKR (to be paid before **October 23, 2025**)
- **2nd Installment:** 7,500 LKR (to be paid before **December 10, 2025**)
- **3rd Installment:** 5,000 LKR (to be paid before **January 20, 2026**)
- **4th Installment** 5,000 LKR (to be paid before **March 6, 2026**)

You can begin the course after completing the first installment. We accept **Visa and MasterCard** for secure online transactions. After you complete the registrations, you will receive a confirmation email from info@ecoastronomy.edu.lk

For the 2025/2026 Winter | academic year, only this intake is exclusively open to Sri Lankan students. Only the **first 50 eligible applicants** will be selected, so early action is highly encouraged.

Process Of Registration

1. All applicants must contact Ms. Nethumi Ayodhya or Adeepa Nisal (**Course Assistant - +94774526520)**
2.Submit your birth certificate to +94774526520 and request a **course permission code**.
3.Finalize the first installment and Join the LMS of Course. [Adeepa Nisal | Technical Assistant - +94774526520]

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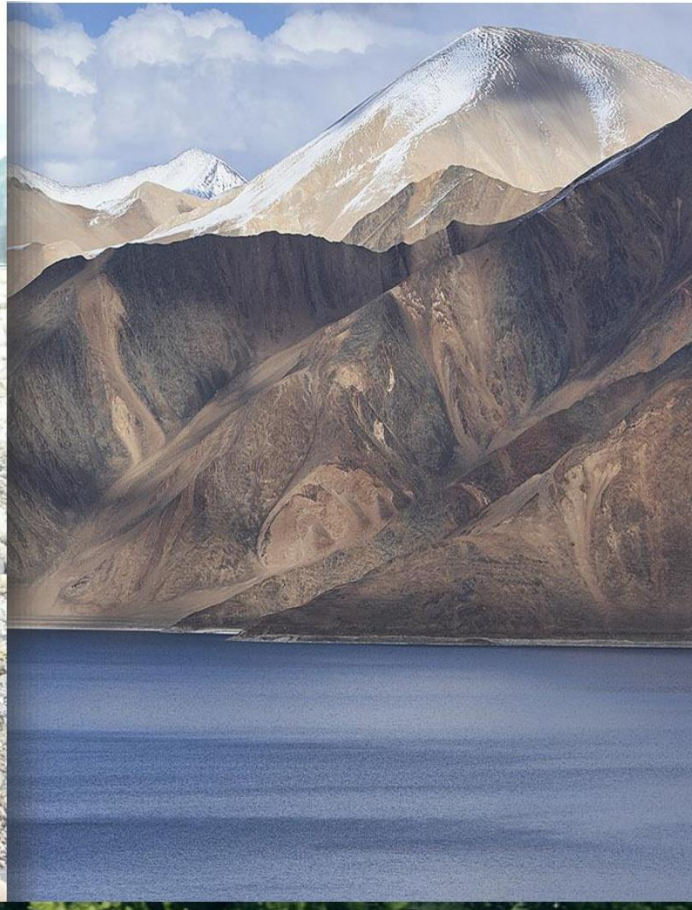

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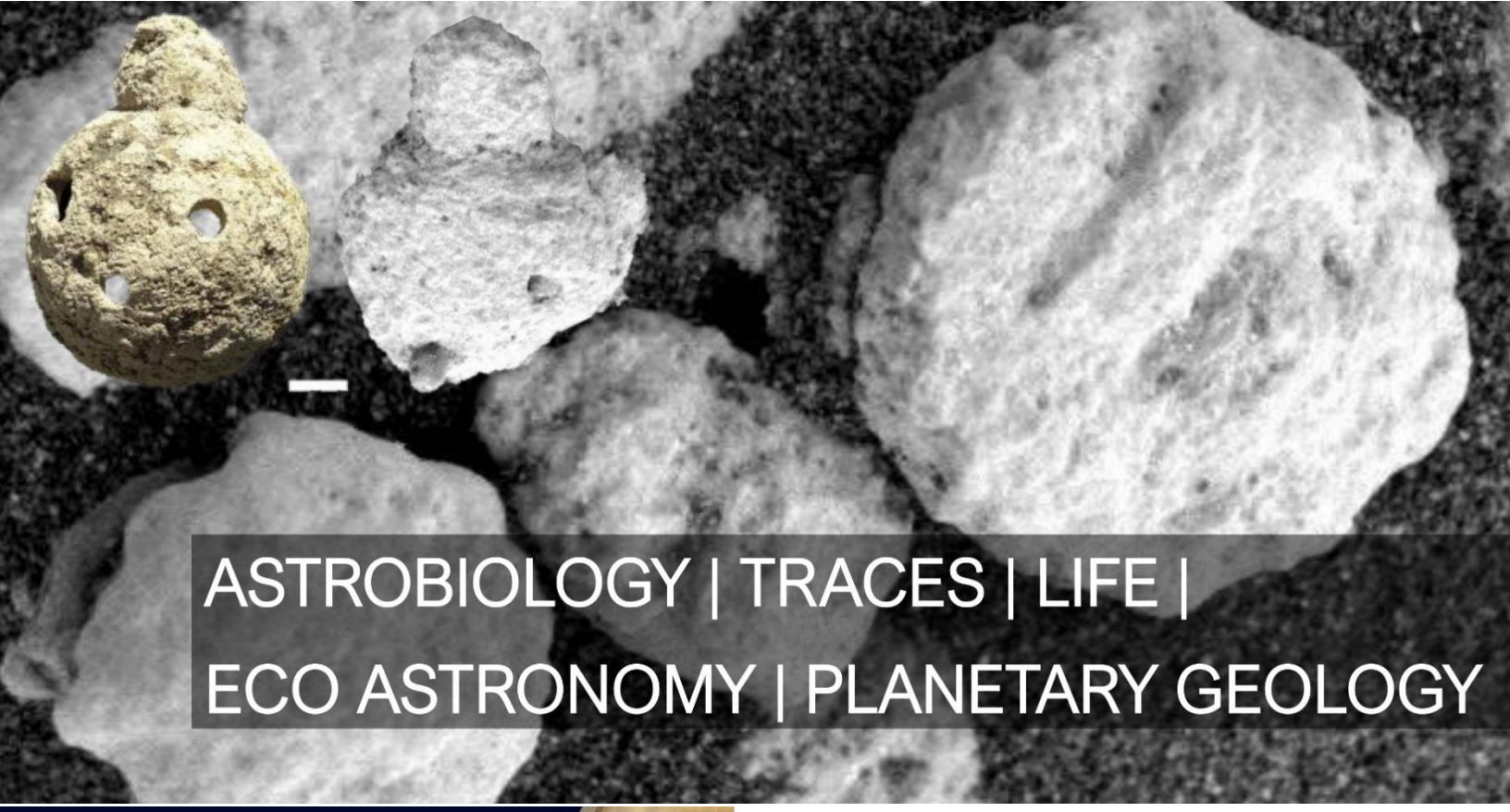

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THE MARS SOCIETY
HUMANS ON MARS
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The Voice of the Mission

Ambassador Directory

Mission Statement
The Mars Society Ambassador Program is designed to serve as a professional team of people dedicated to elevating public awareness of our mission to land humans on Mars within this decade and begin settling the red planet.

The Mars Society
www.MarsSociety.org

Mars Society Ambassadors Are Catalysts for Change

—James Melton, PhD

OUR STORY

In the dark stillness of the night, zero four hundred hours a Zoom link is clicked in Pakistan. Nasir reaches for his notepad for the call. Simultaneously, in Australia, at 0700 hours at dawn, Jonathan is ready for work, but before leaving, he clicks on the Zoom link. In the United Kingdom, at 10:00 PM, Emma and Steve join in. At 4:00 PM in Austin and San Antonio John and Ron are ready. Click, click, click around the world, every time zone.

Suddenly our Zoom link goes live: "Welcome to the Mars Society Ambassador Briefing. It's 2:00 PM Pacific Time. I'm James Melton, Chief Ambassador for the Mars Society. The Mars Society Ambassador program serves as a professional team of volunteers, Mars Ambassadors, dedicated to elevating public awareness of our mission to send humans to Mars and begin settling the Red Planet. To help move this initiative forward, ***this is your invitation to*** ***join the Mars Society Ambassadors***.

Photo montage designed by Michael Stoltz, Mars Society Public Relations Director

Our Mars Society monthly virtual meetings are one-hour programs where Mars Society Ambassadors interact with and support other Ambassadors, sharing stories of events they organized or attended; chapter meetings, the people they met, and insights they gained from their presentations. Guest speakers share current space endeavors and events relating to Mars. Our Mars Society currently has 42 Ambassadors in 17 countries around our home planet. Participating ambassadors are encouraged to join in monthly meetings to connect with, learn, and share their experiences in Mars advocacy.

https://www.marssociety.org/mars-ambassador-program/

9 773084 879008
ISSN: 3084-8792
ISBN: 978-955-23-0019-3

Journal of ECO Astronomy

FROM ECO ASTRONOMY INC RESEARCH NETWORK | Since 2017

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PROJECT PALEO RECONSTRUCTION SRI LANKA

Dr. Jason Kennedy
Senior Lecturer of Animation & Motion Capture,
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Auckland University of Technology.
Associate collaborator of Eco Astronomy Inc.

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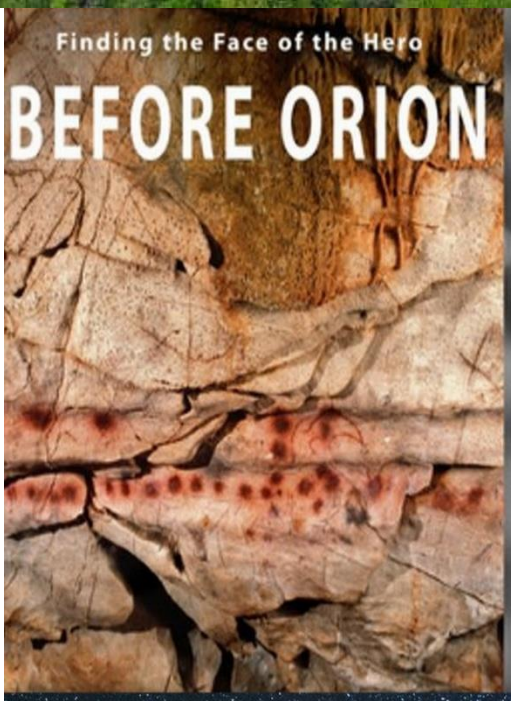

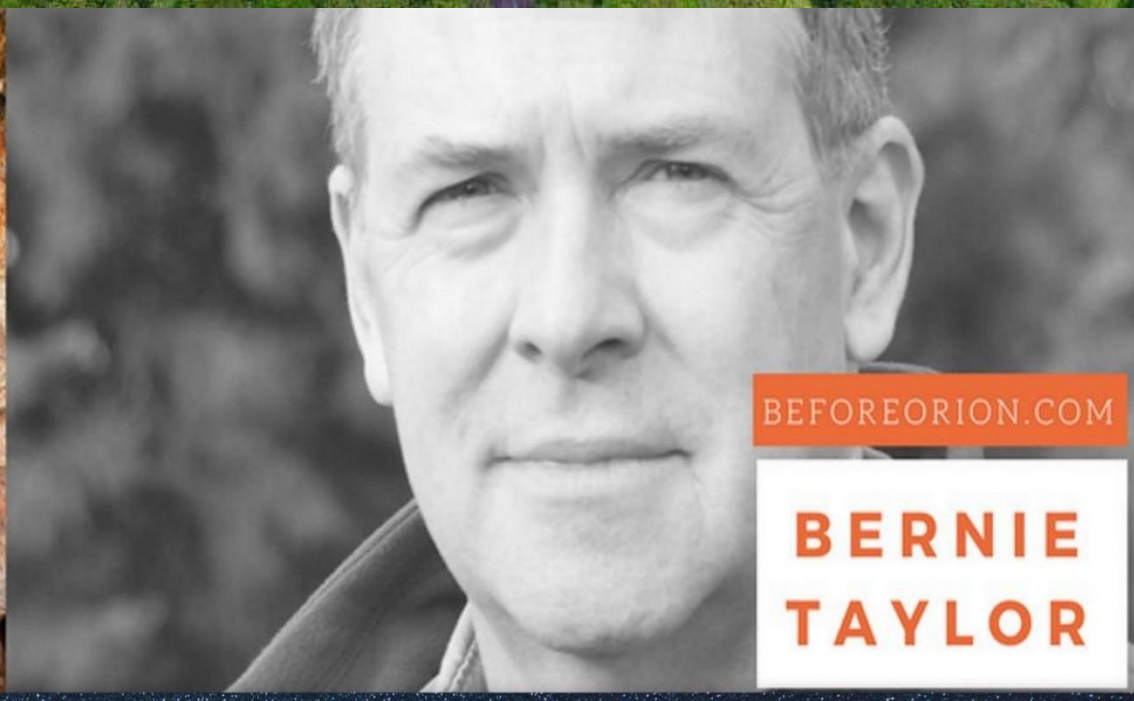

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