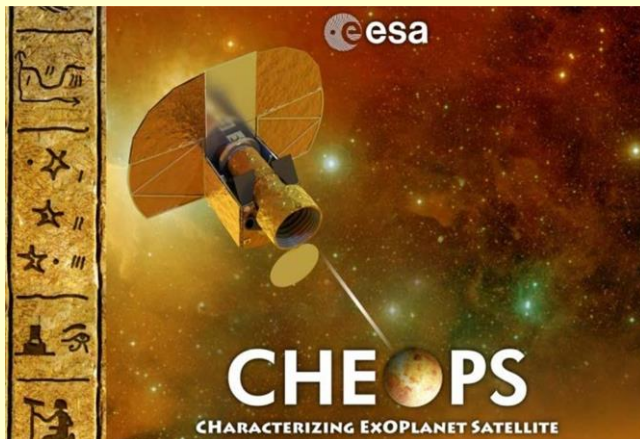


Astrobiology - a new exciting field in a globally changing science landscape

Fundamental questions in science like “How and when did life emerge on Earth?”, “How did our solar system and life evolve and how will it develop in the future” and “Is there life on other celestial bodies” will not be answered by one discipline alone but require a concerted and coordinated approach involving many researchers with seemingly unrelated scientific backgrounds. Also, the European research landscape is rapidly changing on a global scale. Boundaries between disciplines disappear and new cross-disciplinary fields emerge. Astrobiology is one of them. Research in such areas requires interaction and exchange of ideas and new results between scientists from many countries and fields, something that only larger research communities like the European Research Area can accomplish.



The ESA CHEOPS Exoplanet satellite mission: dedicated to characterising exoplanets

New European achievements and future challenges for the European research area

In the last decade many achievements have of astrobiological relevance have been made. More than 3000 extrasolar planets have been detected including the very interesting TRAPPIST system. The extremely Successful CASSINI mission delivered a huge amount of data about Saturn and its satellite Titan, the only moon with a dense and nitrogen-dominated atmosphere. Amongst others, the following fundamental science questions remain to be tackled by scientists with many different backgrounds:

- How are planetary systems and habitable planets formed?
- How can we detect extrasolar habitable planets and satellites?
- How did physical, chemical and geological and biological processes co-evolve on Earth?
- In which environment did life first emerge (Darwin’s little warm pool or some more extreme environment)?
- Which boundary conditions exist for life?
- Where and how did the molecular building blocks of life originate and how were the first cells formed?
- How did our ideas about the origin of life develop and which views about extraterrestrial life exist in different cultures?
- Which philosophical, societal, political, juridical and ethical issues are raised by the search for life on other planets?

Recent European initiatives in Astrobiology - engaging scientists and the general public

The European Astrobiology Network Association (EANA) (European Astrobiology Network Association) has existed for nearly two decades. and many national (e.g. France UK, Italy, Spain, Germany) and one regional (Nordic Network of Astrobiology) exist. An EU COST Action “Origins and Evolution of Life on Earth and in the Universe. Furthermore, an association of students and early career scientists (AbGradE) has been founded. Astrobiology continues to engage the scientific community and the general public alike. This enables the opportunity for astrobiology to involve citizen scientists into research, engage public awareness of science and young people to choose science and technology as a career path.



Time trek - a 13.7 km walking track explaining the history of the universe

Training a new Generation of Scientists - The European Astrobiology Campus

New multidisciplinary fields require that a new generation of scientist is trained to work across boundaries of scientific subjects. The European Astrobiology Campus (EAC), launched as a Strategic Partnership under the Erasmus+ programme has provided a coherent and comprehensive training programme in astrobiology comprising of a series of very summer schools. Furthermore, follow-up expeditions were organised to allow attendees to launch own research projects. Teaching an interdisciplinary subject is also a challenging endeavour for lecturers - therefore a symposium on education in astronomy and astrobiology was organised in cooperation with the IAU. The EAC, which has been selected as a success story by the EU, also sponsored the Encyclopaedia of Astrobiology.



Excavation project by young scientists to date a meteorite impact crater

A new and sustainable structure for European research : the European Astrobiology Institute

To keep up the momentum of recent initiatives and to take a further step in astrobiology research, we suggest the launch of a European Astrobiology Institute. The tasks of the EAI should be:

- Perform ground-breaking research on key scientific questions in astrobiology.
- Disseminate high-quality results of these efforts effectively
- Provide interdisciplinary training for students and early career scientists
- Engage in education on astrobiology on all levels
- Liaise with industry to foster collaboration on technological developments that are relevant to astrobiology research and beneficial to Europe as a whole
- Coordinate outreach activities of European astrobiologists to the general public, industry and all other relevant stakeholders.
- Act as advisory body for and provide high-quality expertise to European research organisations and decision makers
- Ensure the necessary financial means through a coordinated approach to European funding agencies.

An Interim Board composed of leading members of main European stakeholders in the field (ESA, ESF, EANA, EAC, AbgradE etc.) has been formed to prepare the launch of the EAI (planned in 2018/2019)

Astrobiology in Europe Recent Successes and New Initiatives

