General Assembly Meeting of the European Astrobiology Institute

5 October 2021

Motion 2

The General Assembly may approve the following Action Plan of the European Astrobiology Institute for the period 2021-2022.

Action plan for the European Astrobiology Institute

Period 2021-2022

Recruitments of institutions

Although we have a very solid basis of membership, we will try to extend our number of Participating Institutions. We will therefore start a new recruiting round at and around BEACON 2022, which will continue up to summer 2022. Such large conferences are a very good opportunity to recruit new members.

Fourth General Assembly

The fourth General Assembly is planned to take place at La Palma Princess Hotel, Fuencaliente de La Palma (ES) from 25th to 29th April 2021. A field trip to astrobiologically interesting sights on the Canary Islands will be organised for interested participants after the conference. If the volcanological situation permits it, we will visit the lava field of the La Palma eruption. In addition, there will be a 3 days satellite meeting for students and early career scientists just before the assembly. This will be organised in cooperation with AbGradE. Co-funding will be applied for from Europlanet and the French Astrobiology Society. A team of 7 early career scientists will act as the Scientific Organisation Committee for the event. An ample outreach programme is planned together with the community of Fuencaliente. For the general public we plan to organise a science, star-gazing and music night on Saturday before the conference. Any profits of this event will be for the benefit of the victims of the eruption. Also, an astrobiology-centred games afternoon is planned for the "ordinary" guests of the conference venue. An excursion to telescopes at La Palma is also envisaged for the conference attendees.

Apart from taking an active role in the organisation of BEACON 2022, the EAI workshops and summer schools, giving seminars and holding on-line scientific meetings, the Working Groups also plan some special events and activities. The plans for the different scientific Working Groups are depicted as follows:

Thematic WG: Formation and Evolution of Planetary Systems and Detection of Habitable Worlds

The main activities for 2022 include the completion of the collaborative paper entitled: „Habitable Worlds: Formation, evolution, detection and characterization". Once the format of the article and the publisher will be established all contributors to the paper will meet to organise the process of writing. The regular meetings will be set up in order to monitor the progress and discuss the particular scientific questions covered in the article. It is planned that the work will be completed in six months. The expectation is that during the process of writing, some of the already identified scientific topics included in the content of the paper will be transformed into well-defined research projects to be carried on after the work on the article has been completed. The publication of the paper „Habitable Worlds: Formation, evolution, detection and characterization" will be initiated and may require some funding from EAI, but, at the moment, the group investigates different options it is too early to give the numbers.

Thematic WG: Planetary Environments and Habitability

The WG monthly meetings have been reinstalled (upcoming meeting on September 30th) and will be continued with presentations by working group members about research topics relevant for the working group, After an initial discussion with former EPEC Chair Indhu Varatharajan we are planning joint events for Early Career Scientists. This will be discussed also in one of the upcoming WG meetings.

Thematic WG: The pathway to complexity: From simple molecules to first life

The Working Group plans to organise a meeting (preferably in person) in the style of the one happening at Liblice in 2016 "From interstellar molecules to first cells", in order to get the astrochemistry and biochemical evolution communities together. The meeting is planned to take place in Heidelberg in 2022.

Thematic WG: Early life and life under extreme conditions

In cooperation with the Project Team on Tracing Life and Identifying Habitable Environments the project funded by the International Space Science Institute will be carried out. The WG will also hold internal on-line meetings like the ones organised last year. The WG will also actively take part in the preparation of BEACON 2022, the exhibition in Fuencaliente and the field trip organised after the conference. The Working Group will also organise 1 or 2 sessions at the conference.

In autumn 2022 EAI plans a several days meeting “Life Below the surface” on the Azores covering life on seafloor, below the ground and in lava caves. After this workshop, there will be a field trip to the islands of Terceira, Pico, Faial and São Miguel, where participants can visit and sample at interesting field sites (solfatares, lava caves, hot springs, recent lava fields etc.).

Thematic WG: Biosignatures and the detection of life beyond Earth

There will be a meeting on the subject “Astrobiology in Space Missions “in late summer/autumn 2022. A Scientific Committee has been assembled and invitations to potential speakers will go out in late 2021. The Working Group is also planning two on-line workshops in autumn and winter 2021/22 on the astrobiology in future space missions. One will focus on Mars and one on outer planets. The EAI will also be engaged in a joint meeting of the “Chemistry” and “Astrobiology” Working Groups of the oncoming ARIEL mission. This meeting will be hold during 5 days 5 days in Liblice (CZ) in May 2022.

Thematic WG: Historical, philosophical, societal and ethical issues in astrobiology

The activities of the Working Group will focus on the preparation of two events in late spring 2022, namely a summer school entitled “Life on Earth and Beyond” to be organised on the island of Ven (SE) in late May 2022 and a workshop on “Astrobiology and Society” to be organised in Höör in the days following the summer school, allowing interested scientists and students to attend both events with only one travel. Two similar events were held in 2015 with great success. Furthermore, virtual workshops will be held on the focus subjects. A further workshop on legal, societal and ethical questions concerning the commercialisation of space is planned to take place in Kiruna (SE) in 2023 or 2024.

Training (European Astrobiology Campus)
The EAI Academy will be starting in October 2021 and continue into 2022. It will comprise a series of 16 didactic talks on the following four topics:

- Trips to the Outer Solar System
- Habitability of exoplanets
- Life in the dark
- Co-evolution of planetary geospheres, atmospheres and biospheres".

The seminars will be offered for free and will be streamed online every two weeks. Each session will include a 30-40 minute didactic talk given by an expert. The talk will be followed by about 20 minutes of questions and answers. The EAI Academy seminars will be broadcast online via zoom and the sessions will be hosted by the Center for Astrobiology (CAB). At the end of the series, students will be asked to write a review or encyclopaedia entry about a subject of their choice covered by the seminar. The University of Tartu will award 3 ECTS credits to persons who have attended at least 5 seminars and completed either a review or encyclopaedia entry. Both tasks are peer-reviewed for acceptance.

The RED'22 will be held in LeTeich in early spring providing basic training in astrobiology. We also plan a training workshop in Tartu on micro-and nanosatellites in summer 2022 again, preferably in cooperation with Europlanet. Accommodation and meeting venues have already been secured.

In autumn 2022 there will be a training school on *Volcanism, Plate Tectonics, Hydrothermal vents and Life on Early Earth.* This will be organised together with the colleagues from the University of the Azores. The focus will be an introduction into history of early life on Earth and the influence of geodynamic processes on life and the role of volcanism, plate tectonics and hydrothermal vents in the emergence of life.

The summer school scheduled for 2020 on "*Formation of planetary systems and detection of habitable planets and moons*" will take place in Torun (PL) in August 2022. Visits of interesting sights (Morasko impact crater), museums and group work on outreach will be integrated into the programme of the summer school.

There will be also a training workshop again on "Micro-and nanosatellites in planetary science" which will take place in Tartu (EE) in the first 2 weeks of August. It will contain 2 parts: one introductory part for the newcomers and one discussion and workshop part for the existing teams of scientists and the newcomers alike. Accommodation and venues have already been secured.

Activity WG: Field sites and Field Site Managements
One of the most important tasks will be the preparation of the two field trips, the one at the Canaries after the General Assembly and the one at the Azores. Other plans on a longer range are as follows:

1. Creation of Official Field sites

We plan to create official field sites of the EAI for which the institute provides detailed information to the community. Characterisation of an official field site should be:

- Availability of detailed information on the web about field sites, infrastructure and red tape
- Lab and logistics infrastructure at local universities
- Cooperation with citizen scientist and other organisations
- Use of field sites for training events possible
- A dedicated field officer or more acting as a point of contact, to provide specific information of the given site and to support scientific and logistical planning for the activity at the given location.

Based on the Research Infrastructure proposal that will be submitted and include some field sites, the following field sites are envisaged:

- Azores (lava caves and solfatares)
- Iceland (lava caves, hot springs, glaciers, hydrothermal systems Mars-analogue landscapes)
- Romanian caves (ice caves, caves with special environments)
- Southern Italian volcanic areas (Pantelleria, Liparian Islands) in cooperation with the ROBEX alliance in Germany
- Australia (early life and ancient rock sites (Pilbara), stromatolites
- Greece: Santorini, Milos, and Nisyros Islands.

2. Protection of field sites

Another area of activity also will be lobbying work for protection of field sites cooperation with the WG on Funding and Policy. Many sites are endangered due to careless visitors and ruthless industrial and touristic exploitation of astrobiologically relevant field sites. Here we can be really active and with some powerful organisations in our institute we should also have a greater pondus to get our voice heard than individual organisations and scientists.

3. Preparation of field sites for Mars Sample Return

The task will be to develop Mars-analogue field sites for that mission together with scientist and organisations active in the mission and with the Project Team on Mars Sample Return.

Activity WG: Outreach and corporate identity

One major tasks was the design of the new website, which is now running. It is the task of the Working Groups to appoint webmasters and to create their individual subpages.

In addition, the WG will organize outreach events that were originally planned for BEACON 2020 (postponed due to the coronavirus pandemic) at BEACON 2022 in La Palma, to benefit both the locals and tourists at the site: a panel discussion about life in the universe, a science-music evening, a stargazing night, and an astrobiology bingo for children.

We will also continue and extend the already very successful work with social media (LinkedIn, Facebook, Twitter)

Activity WG: Dissemination and Intellectual Output

On-line seminars on a biweekly basis or at least monthly basis by the EAI are planned to continue. These can concentrate on the focus themes of the working groups and other hot topics in astrobiology. The WGs have come in with suggestions for speakers and time slots have already been filled until March 2022 and we are confident to find speakers for the remaining time until summer 2022.Those activities are good advertisement of the EAI and create an active life of the Working Groups and Project Teams even under those difficult times.

Activity WG: Education

Education activities will carry on collecting astrobiology related educational materials and add a list of materials from non-EAI affiliated sources that are freely available. The WG will work out ways how to make these visible with EAI website team. In 2021-2022 the WG will further the collaboration with (local) science centres to offer astrobiology related subjects to their activity plans. For that purpose, the WG will shortlist the main themes that have the potential to arouse interest among different generations and offer astrobiology expertise during planning and preparatory phase. Furthermore, the WG will contribute to outreach and education activities during the next GA in 2022.

Activity WG: Funding and policy

The WG will focus on the following themes:

- Funding possibilities
- Co-operations with astrobiology organisation outside Europe
- Protection of field sites
- Mars Sample Return Mission

Concerning the first point it is important to not only to make sure that EAI entities are alerted to future funding possibilities on European, regional (e.g. Nordic) and national level. It is also important to work proactively to include astrobiology-related issues into funding and research programmes. The WG will also discuss and prepare partnership agreements with ACA (Australia), SETI (USA) and ELSI (Japan). Together with ELSI we plan to submit a bid for a core-to-core collaboration of the JSPS. One area of activity will be lobbying work for protection of field sites. The WG will also address political issues concerning the Mars Sample Return These will also be discussed at the meeting in late summer 2022. The WG will also inform EAI entities and their members about relevant policy documents concerning the mission. Concerning the Horizon Europe programme, the EAI will resubmit a proposal for a "Starting Community Grant" in spring 2022. We will also consider making bids for the following grants:

- HORIZON-WIDERA-2021-ACCESS-03 (Teaming)
- HORIZON-WIDERA-2022-ACCESS-04 (Excellence Hubs)
- HORIZON-WIDERA-2021-ACCESS-05 (European Excellence Initiative)
- HORIZON-WIDERA-2021-ERA-01-60 (Citizen Scientists)

Activity WG: Industry Liaison

The following plans are envisaged for the coming years:

- Providing general information about issues concerning industry academia collaborations (both on the web at the EAI website, at scientific meetings and through personal contacts addressing academia as well as industry) including:

        - Planning of academia- industry collaborations
        - Forms of collaboration
        - Co-supervision of students
        - Grants for industry – academia co-operations
        - Patent issues
        - Interested cooperation partners from academia and industry
    - Gathering and highlighting examples of successful partnerships between academia and SME/industry
    - Alerting the scientific community as well as interested companies to call deadlines for funding of grants focusing on or including industry – academia partnerships
    - Providing support for writing proposals for funding of industry-academic co-operations
    - Co-organising training events in generic skills for early career astrobiologists in cooperation with the European Astrobiology Campus
    - Helping to raise sponsoring of meetings
    - Organising information events on "Careers in space technology and biotechnology for astrobiologists" at a regular basis
    - Organising fairs and stalls of companies around large events
    - As a long-term project: Providing a database for industry – academia collaborations containing:
        - Short presentations of companies interested in cooperation with higher education and research institutions
        - Presentations of research groups and institutions interested in such co-operations
        - A listing of open internships and Ph. D. research positions of astrobiological relevance that are available
        - A listing of companies at our website that are willing to participate in proposals for EU projects (This might make it easier for scientists to find industrial partners)
- Create long-standing cooperations with enterprises (especially SMES) engaged in
    - Ecoturism: training guides and improving knowledge inside companies about the field sites and their ecosystems to foster site preservation and to improve the performance of them and their marketability and benefit to local communities
    - Providers of lab equipment: improving supply chains to enable efficient lab and field site use, especially to institutions in remote areas and Less-represented member states
    - Biotechnology companies: to ensure that marketable research results are exploited by European companies in a sustainable and environmentally friendly way respecting General Data Protection Regulations.
    - Mining: Promoting sustainable mining in field sites
- Provide the European economy with expertise and future personnel by training the next generation of scientists and engineers using a holistic and multidisciplinary approach

Many of these things are also part of the proposal for a Research Infrastructure Starting Community proposal.

Project Team: Tracing life and identifying habitable environment

The ISSI Team proposal The work of the ISSI initiative "TOWARDS A UNIVERSAL TRACERS PORTAL" will start in November 2021 with a virtual kick-off meeting, to which in total 26 experts from different fields and perspectives have been invited, to discuss and brainstorm on tracers of habitability as well as tracers of life (together with potential problems regarding nomenclature, misunderstandings between different scientific fields, how to establish

a common language) in three different domains: Earth, Solar System and exoplanets research. The kick-off meeting will end with a cross-disciplinary discussion on how to best establish the planned tracers portal, and to identify tasks and milestones, as well as the final composition of the ISSI working group (consisting of ~10 participants).

Project Team: "Protoplanetary disks and their physical and chemical processes"
The team will carry out the following activities:

- Submission of proposal for a COST Action "The birth of solar systems" in October 2021
- March 2022: in-person team workshop at Schloss Ringberg, scientific program aligned with COST Action Working Groups
- If COST Action successful: begin recruitment of Action members, and set up management committee and working group chairs
- If COST Action unsuccessful: revise and resubmit in October 2022
- Transfer the temporary team website to the EAI one

Project Team: "Impacts and their Role in the Evolution of Life"
The team will be planning a workshop and a summer school Nördlingen (Ries impact crater) in 2021 which will include an ample outreach programme with an art exhibition.

Project team: "Science Fiction as A Tool of Astrobiology Outreach and Education"
The team plans the following activities:

- *Life Beyond Us* is currently in the phase of mid-editing the stories; the essays will follow soon
- In late spring 2022, the anthology should be ready for copyediting, layout, graphics etc., and it should be published in September 2022
- The project will be presented at further congresses, summer schools and seminars
- Interviews with selected authors and scientists will follow
- If the project is successful, a second volume could be prepared in 2023 for 2024 publication

Project team: "Mars Sample Return"
The MSR-PT aims to support the preparation and realization of the Mars Sample Return (MSR) initiative, focusing on the European contribution for astrobiology aspects, and also working concurrently with related international efforts, mainly the activities of ESA and NASA. This project team will support the scientific agenda of MSR by direct research activities (providing expertise in astrobiological disciplines indispensable for MSR, such as microbiology, paleobiology, mineralogy, geology, geochemistry, planetology, chemistry, planetary protection, philosophy etc.). The project team will initiate collaborations, which will widen participation using the interdisciplinary links provided the EAI between their members. However, this project does not intend to orient or influence already existing groups and their activities, but to support collaborative interdisciplinary research that will lead to results in cross-domain disciplines. It will also provide opportunities for researchers at institutions that are not yet involved in the international research to become active in MSR research.

Administration
The administration will be carried out by our host organisation (European Science Foundation).