EUROPEAN ASTROBIOLOGY INSTITUTE

Taking European Astrobiology Research, Training and Education one step further

BACKGROUND

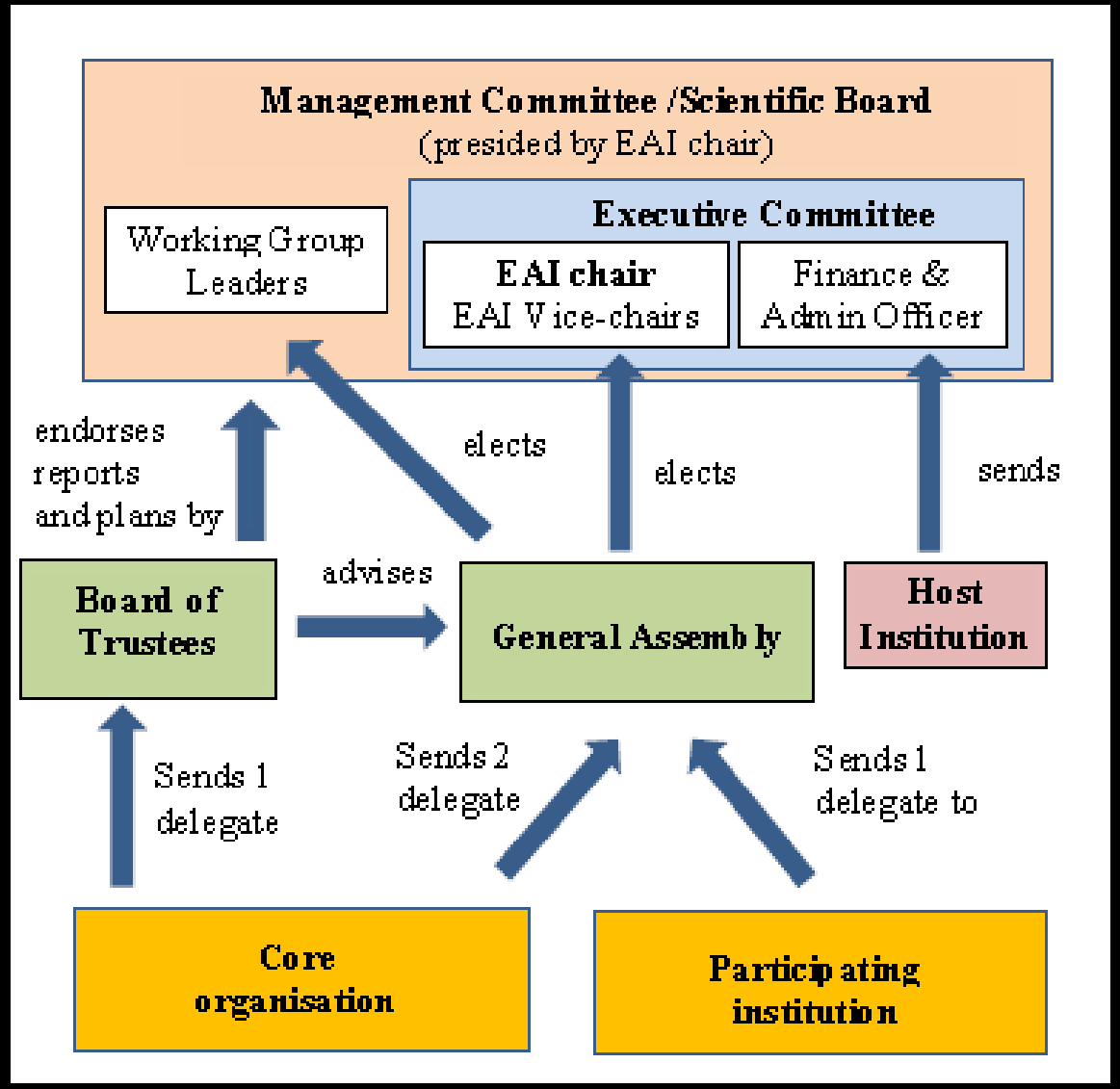
- **Astrobiology institutes** uniting several institutions exist in several countries, Most famously **NAI** (USA), founded 1998
- **In Europe**
  - **EANA and local and regional networks** exist
  - **2 very successful recent initiatives** (COST Action, European Astrobiology Campus EAC))
- **Momentum of these initiatives** should be kept
- **AstroMap report** (under FP 7) recommends European Astrobiology Platform or Institute

GENERAL FEATURES OF THE EUROPEAN ASTROBIOLOGY INSTITUTE

- **Virtual Institute** founded by research and higher education institutions and organisations (no buillding)
- **Inclusive but manageable**
- **Collaborations of institutions** not individuals
  - Local team coordinator at each entity
  - Manageable size of structures and organic growth
  - Members can be both Higher Education and Research Institutions and enterprises, museums, governmental and NGOs etc.
  - Avoid doubling of existing structures (EANA, ISSOL)
- **Wide range of activities** (Science, Training, Outreach, Networking, Meetings)

STRUCTURE OF THE EAI

- A **General Assembly**
  - acting as the highest decision-making body of the EAI,
- **Working Groups** with responsibility for scientific themes and fields of activities
- A **Management Committee** consisting of the chair, vice chair(s) and the Working Group Leaders
- An **Executive Committee** for the day-to-day administration of the EAI.
- **Host Institution** (planned European Science Foundation)



SCIENTIFIC WORKING GROUPS

- Formation of planetary systems and detection of habitable planets and moons
- Early earth environment and habitability
- The pathway to complexity: From simple molecules to first life
- Early life and life under extreme conditions, and their signatures
- Biosignatures and methods for detection of life on other celestial bodies
- Historical, philosophical, societal and ethical issues in astrobiology

ACTIVITY WORKING GROUPS

- **Approach to governmental and intergovernmental organisation and funding** (Funding and Policy)
- **European Astrobiology Campus EAC** as training organisation (Universities)
- **Education** (Schools)
- **Outreach** (General public)
- **Dissemination and Intellectual Output** (Scientific Community)
- **Industry Liasion**
- **Field sites**
- **Access to Research Infrastructures**

The European Astrobiology Campus – an Erasmus+ Strategic Partnership highlighted as success story by the EU

TRAINING ACTIVITIES (EAC)

- Production of **training and education material**
- **Training events**
  - Basic training schools in astrobiology
  - Specialised training schools in sub-fields (preferably involving field exercises)
  - Training events for generic skills
- **Collection of astrobiology lectures available on-line** (astrobiovideo.com)
- **Development of courses together with students** / early career scientists

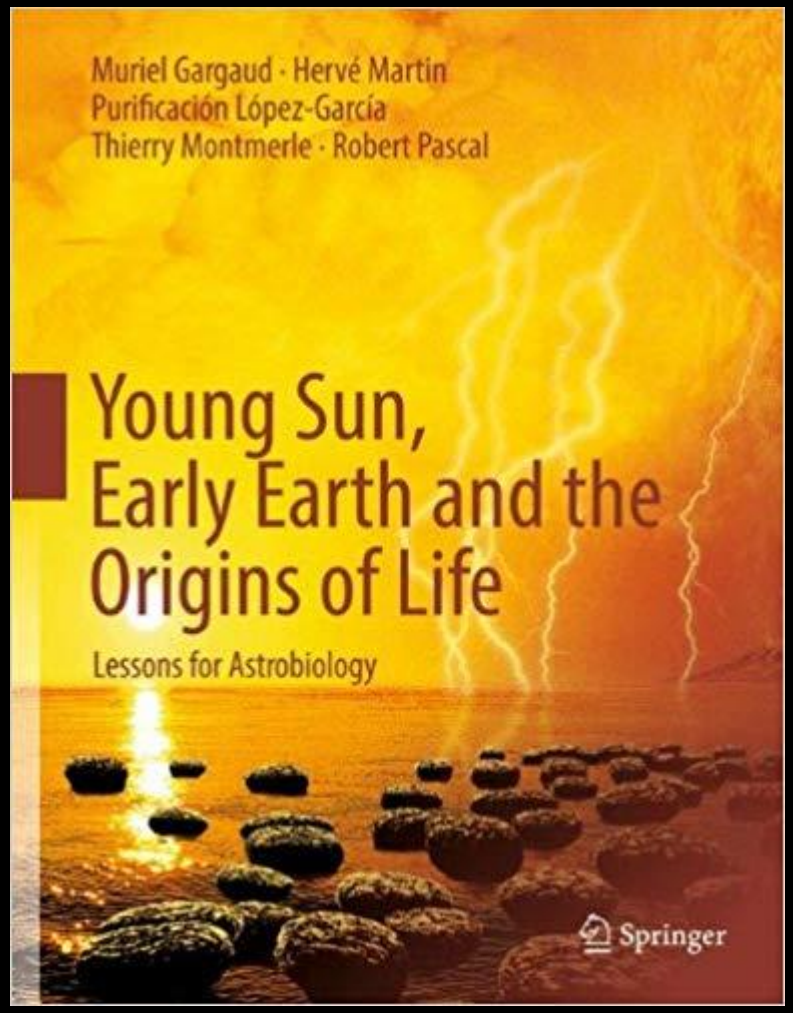
Dating a small impact crater
during a Summer school at Saaremaa, EE

EUROPEAN ASTROBIOLOGY CAMPUS
EAC

Online Courses in Astrobiology
IAU

EDUCATION ACTIVITIES

- Provide **education material** for all levels
- Include **all kinds of forms**, e. g. books, experimental kits, software etc.
- Encourage **translation of material** to important other languages
- Promote ways to work with **IT in education**
- Regular **meetings on training and education** in cooperation with EAI



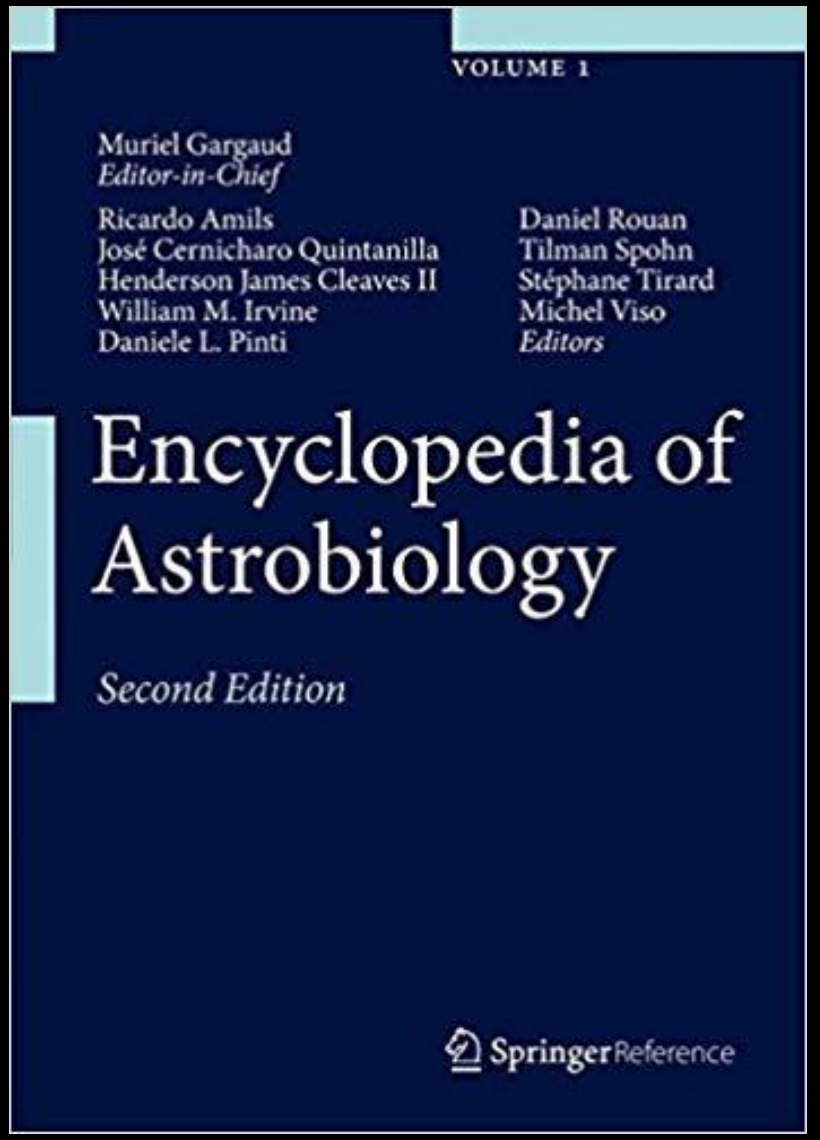
OUTREACH ACTIVITIES

- Organise **permanent and migrating exhibitions**
- **Cooperate with museums** and museums associations
- Coordinate both **production and promotion** of material for outreach activities
- Use of **new techniques in outreach** (apps)
- **Extend outreach to all possible stakeholders** (industry, education authorities, etc.)
- Involve **citizen scientists** in research projects

Time Trek – a walking path explaining the history of the Universe (Turku, FI)

DISSEMINATION AND INTELLECTUAL OUTPUT

- Endorse **coverage of astrobiology in scientific journals** by, e.g. proposing special issues.
- Create **high-quality reference works** (like the Encyclopedia of Astrobiology)
- Collaborate with **astrobiology journals**
- Organise **web-streamed seminars**
- Ensure coverage of **scientific meetings** (streaming, recording)
- Organise **lecture tours** of internationally leading scientists



FIELD WORK

- **Develop field sites** and **support infrastructure**
- **Concerted field campaigns**
  - Sharing expertise and equipment
  - Local support with red tape
  - Outreach activities
- Special efforts to support **teams of students and early career investigators**
- **Collaboration with local universities and citizen scientist societies**
- Arrange **field-based workshops**

Expedition of the Early career Scientists' team PELE to Iceland in cooperation with the Icelandic Speleological Societies

INDUSTRY LIAISON OF EAI

- **Include both scientists and industrial partners** into the working group
- Devise **novel schemes for collaboration** between research and industry
- Alert the **scientfic community** to cooperation possibilities
- Working group should be led by an **Industrial Liaison Officer** in the EAI to act as a link between industry and research and lead the activity group

FUNDING AND POLICY

- **Approach and inform decision makers** in governmental and non-governmental organisations to promote astrobiology research
- **Actively alert individual scientists** to funding possibilities
- **Avoid duplicate proposals** and work for approaching funding agencies in a coordinated and comprehensive way
- Keep a **calendar/database for funding calls** and deadlines
- Participate in **Research Infrastructure Starting Community Call in 2020**

MEETINGS

- One **large European Astrobiology Conference** second year (Alternating with AbSciCon) in spring
- **General Assembly** associated with this conference
- **Smaller workshops** on an ad.hoc basis
- **Regular meetings** of AbgradE

THREE DIFFERENT FORMS OF MEMBERSHIP

- **Participating institutions** (Local Higher Education and Research Organisations)
  - Requirement: Legal personality
  - Membership fee EUR 2000,-per year, EUR 1000,- for Less represented Countries
  - Have local teams
  - One repesentative in General Assembly
- **Core organisations** (National and European Research organisations)
  - One represntative in General Assembly
  - Fee EUR 8000,- per year, EUR 4000,- for ITCs
- **Affiliated groups** (Individual Research Groups)
  - Smaller groups of scientists, juridic persons, etc.
  - Fee EUR 500,- per year, EUR 250,- for ITCs
  - No representation in General Assembly
- **Fees necessary to keep minimum of activity**

All these are eligible to obtain funding from the money from membership fees for EAI to participate in EAI activities. Members of other institutions can participate on their own cost.

EANA AND ABGRADE

- **EANA and AbGradE** will be sending **a representative** to the Management Committee of the EAI
- will be allowed to **send one delegate with active voting** right to the General Assembly a funding possibilities
- **No fee** will be asked from these organisations
- **Participation in Working Groups** will be open to any researcher (decision lies with WG)
- Members of EANA and AbgradE are **only eligible for the positions of Chair, Vice Chair and WG leaders if their organisation contributes to EAI** as Core Organisations or Participating Institutions
- Members of EANA and AbgradE can only be **refunded for pariticipations in EAI if their organisation contributes to EAI** as Core Organisations or Participating Institutions. Exceptions are invited speakers, training events and funding from other sources outside the contribution on member entities.

TIME PLAN

September 2018: Presentation of the EAI plans at the ESPSC and EANA workshop

Autumn 2018: Discussion of the EAI Action Plan with **the whole** Astrobiology Community. Amendments and extension

13 November 2018: Event with European Members of Parliament

Winter 2018/2019: Recruitment of Institutions

End of May 2019: Launch of EAI and first General Assembly.

INTERIM BOARD

John Brucato, INAF
Maurizio Falanga, ISSI
Muriel Gargaud, COST Action TD 1308
Thomas Henning, MPI for Astronomy
Ján Hrušak, Czech Academy of Sciences
Emmanuelle Javaux, University of Liège
Kalle Kirsimäe, European Astrobiology Campus
Jesús Martinez-Frias, CSIC
Nigel Mason, Europlanet
Stephane Mazevet, CNES
Piero Messina, ESA
Karen Olsson-Francis, Open University
Tilman Spohn, German Aerospace Centre
Ruth-Sophie Taubner, AbGradE
Michel Viso, CNRS
Nicolas Walter, ESF
Frances Westall, EANA
Wolf Geppert, Nordic Network of Astrobiology

Nov 2018: First in person meeting in Strasbourg

Thereafter: Regular teleconferences

WEBSITE AND FORUM

EAI: **www.europeanastrobiology.eu** (preliminary website)

Forum: **https://groups.google.com/forum/#!forum/europeanastrobiology**

(can be searched on Google groups, information how to join on website)

MANY THANKS!

NASA ASTROBIOLOGY STRATEGY

- Last Astrobiology Roadmap 2008
- Strategic objective in planetary science: ”

- Three big questions
  - How does life begin and evolve?
  - Does life exist elsewhere in the Universe?
  - What is the future of life on Earth and beyond?
- Recently more habitability centered
  - Why is Earth habitable? How, when, and why did it become habitable?
  - Are, or were, any other bodies in our Solar System habitable?
  - Might planets orbiting other stars be habitable?
  - What sorts of stars are most likely to have habitable planets?

NASA ASTROBIOLOGY SUBJECTS

IDENTIFYING ABIOTIC SOURCES OF ORGANIC COMPOUNDS

- What Were the Sources, Activities, and Fates of Organic Compounds on the Prebiotic Earth?
- What is the Role of the Environment in the Production of Organic Molecules ?
- What is the Role of the Environment on the Stability and Accumulation of Organic Molecules?
- What Constraints Can the Rock Record Place on the Environments and Abiotic Reactions of the Early Earth?

SYNTHESIS AND FUNCTION OF MACROMOLECULES IN THE ORIGIN OF LIFE

- Paths to Today's DNA/RNA/Protein-Dominated World

EARLY LIFE AND INCREASING COMPLEXITY

- Origin and Dynamics of Evolutionary Processes in Living Systems: Theoretical Considerations
- Fundamental Innovations in Earliest Life
- Genomic, Metabolic, and Ecological Attributes of Life at the Root of the Evolutionary Tree (LUCA)
- Dynamics of the Subsequent Evolution of Life
- Common Attributes of Living Systems on Earth

NASA STRATEGY SUBJECTS

CO-EVOLUTION OF LIFE AND THE PHYSICAL ENVIRONMENT

- How Does the Story of Earth—Its Past, Present, and Future—inform us about how the Climates, Atmospheric Compositions, Interiors, and Biospheres ofPlanets Can Co-Evolve?
- How Do the Interactions between Life and Its Local Environment Inform Our Understanding of Biological and Geochemical Co-Evolutionary Dynamics?
- How Does Our Ignorance About Microbial Life on Earth Hinder Our Understanding of the Limits to Life?

IDENTIFYING, EXPLORING, AND CHARACTERIZING ENVIRONMENTS FOR HABITABILITY AND BIOSIGNATURES

- How Can We Assess Habitability on Different Scales?
- How Can We Enhance the Utility of Biosignatures to Search for Life in the Solar System and Beyond?
- How Can We Identify Habitable Environments and Search for Life within the Solar System?
- How Can We Identify Habitable Planets and Search for Life beyond the Solar System

SYNTHESIS AND FUNCTION OF MACROMOLECULES IN THE ORIGIN OF LIFE

- What are the Fundamental Ingredients and Processes That Define a Habitable Environment?
- What are the Exogenic Factors in the Formation of a Habitable Planet?
- What Does Earth Tell Us about General Properties of Habitability (and What is Missing)?
- What Are the Processes on Other Types of Planets That Could Create Habitable Niches?
- How Does Habitability Change Through Time?

NASA STRATEGY SUBJECTS

Challenges and Opportunities in Astrobiology

- What is Life?
- How Will We Know When We Have Found Life?
- Can We Draw the Boundary Between Prebiotic Chemistry and Life?
- How Can We Account for “Weird Life” That May Have Alternative Biochemistry or
- Alternative Habitability Constraints?
- How Should Astrobiology Approach Perturbations to Planetary Biospheres by Technological Civilizations on Earth and Elsewhere in the Universe?
- How Does Astrobiology Relate to Other Fields, and How Does It Operate in the Context of Those Other Efforts?