

The Centre for Origin and Prevalence of Life

Molecular building blocks for life

Conditions for complex life
Diversity of planetary environments
Non-standard forms of life

Founded in 2022 as an interdisciplinary centre for research and teaching focussing on:

- How did life on Earth begin?
 - How did life develop and proliferate?
 - Is there life on other planets?



Scientific Objectives

Establishing self-replicating peptide amyloid

and their interplay between membrane and **RNA** towards the construction of a **proto cell**. Roland Riek, **D** CHAB

Paolo Arosio, **D** CHAB

Designing synthetic membrane-less compartments for the organisation of biochemical reactions in space and time.

Using light and the coupling between bacteria and inorganic materials to produce small molecules, such as O2, H2 and NH3, etc.

Thomas Lippert, **D** CHAB & PSI

Developing advanced X-ray techniques for the non-destructive structural and chemical high-precision volumetric characterisation of unique samples.

Marco Stampanoni, **D** ITET & PSI

Exploring the diversity of **exoplanet interiors** and their atmospheres and finding out which planets can evolve and sustain surface conditions suitable for life.

Caroline Dorn, **D** PHYS

Examining atmosphere formation around rocky planets (both in our own Solar System and beyond) to determine the conditions that lead to the **development of life**.

Paolo Sossi, **D** ERDW

Martin Pilhofer, **D** BIOL

Studying the role of reduced (organic) carbon as a component of the **global carbon cycle**. Timothy Eglinton, **D** ERDW

Studying the emergence and evolution of cellular complexity.

Investigating the environmental limits of life

and the **evolution of metabolism**. Cara Magnabosco, **D** ERDW

Studying the genetic basis of adaptation to harsh and changing environmental conditions.

Alex Widmer, **D** USYS

Studying the role of **tectonic** and Earth surface processes is controlling the distribution of **biodiversity** through the diversification of topography and habitat. Sean Willet, **D** ERDW

Quantum chemical elucidation of prebiotic reaction networks for abiogenic molecule production.

Markus Reiher, D CHAB

Exploring the role of peptides in the emergence of the molecules of life, in particular, the potential role of peptides as catalysts. Helma Wennemers, **D** CHAB

Understanding the **interplay** between geodynamics, surface processes, and climate in shaping the diversification of life, while also investigating the reciprocal feedback between life and the planet.

Studying the emergence of microbiomes and cellular complexity.

Understanding the environmental conditions, mainly atmospheric composition and with Earth as a **template**, that facilitate the development of life.

Derek Vance, **D** ERDW

Loic Pellissier, **D** USYS

Julia Vorholt, **D** BIOL

composition

sustain interplay system planets adaptation atmospheres planets developing investigating

understanding solar history

diversification atmospheric rocky tectonic

earth

diversity prebiotic studying interior planet ification atmospheric studying co-evolution role cellular

stage co-evolution role

environmental atmosphere phytoplankton

complexity

influences

throughout 🕒 📘 chemistry formation

evolution emergence conditions surface planetary moons environments

dynamics

chemical exploring processes

development solid

Understanding the co-evolution of life and environments throughout Earth's history. Jordon Hemingway, **D** ERDW

Investigating the **chemical differentiation** of rocky planetary bodies: core segregation, magma oceans, and crust formation. Max Schmidt, **D** ERDW

Understanding the extent to which the chemistry of planetary atmospheres can themselves represent an observable for life (biosignatures).

(origins and compositions, chronology and volatiles) of **planetary** and **asteroidal** environments. Henner Busemann, **D** ERDW

Setting the stage for life - cosmochemistry

Improving the understanding of the formation of planets and moons that can potentially sustain life. Judit Szulagyi, **D** PHYS

Developing methods for exploring and characterizing the near surface of planets and moons in our own solar system. Johan Robertsson, **D** ERDW

Investigating the transport of dust in the solar system and its role in the evolution of planets and as a carrier of prebiotic material throughout the solar system.

Veerle Sterken, **D** PHYS

Understanding the adaptation of marine phytoplankton to the evolution of the atmosphere, and exploring how phytoplankton evolution influences atmospheric composition.

Heather Stoll, **D** ERDW

Understanding the **chemistry** of hidden bacterial life. Jörn Piel, **D** BIOL

Assessing **species** evolution in **deep time**. Tanja Stadler, **D** BSSE

Uncovering the **diversity** of prevalent microbial life.

Modelling and understanding the influence of plate tectonics for the evolution of complex life on Earth and other planets.

Taras Gerya, **D** ERDW

Shinichi Sunagawa, **D** BIOL

Studying the origin, evolution, internal structure and dynamics of planets and planetary **systems**.

Understanding how the **dynamics** of the solid Earth, including the long-term tectonic evolution, influences life on our planet. Oliver Bachmann, **D** ERDW

Understanding the compositional diversity of exoplanets and its implications for interior dynamics, atmosphere and interior coevolution and hence habitability.

Paul Tackley, **D** ERDW

Domenico Giardini, **D** ERDW

Setting the stage for life - cosmochemistry (origins and compositions, chronology and volatiles) of **planetary** and **asteroidal** environments.

Maria Schönbächler, **D** ERDW

Research and Teaching

scientific Developing the context, technologies and instruments for groundand space-based facilities to search for indications of life in the atmospheres of nearby **extrasolar planets**.

Sascha Quanz, **D** PHYS

International Network – The Origins Federation

Leverhulme Centre for Life in the Universe

Origins of Life Initiative

Center for the Origins of Life

Centre for Origin and Prevalence of Life



Derek Vance, **D** ERDW





Postdoctoral Fellowships NOMIS – ETH Fellows Doctoral Fellowships Short-term Visitors Visiting Scholars

Research Projects Seed Funding Conferences and Seminars COPL related Professorships Interdisciplinary Studies













