

15 PhD Positions available

within the Marie Skłodowska-Curie actions Innovative Training Network (ITN-ETN)

” BASE-LiNE Earth ”

We invite applications to undertake competitive high-level research on the complex Phanerozoic seawater history through the determination of original proxy information preserved in reliable ancient geological archives like fossil brachiopods using cutting edge technologies and experimental approaches. »*Brachiopods As Sensitive tracers of gLobal marINe Environment: Insights from alkaline, alkaline Earth metal, and metalloid trace element ratios and isotope systems*« (BASE-LiNE Earth) is funded through the HORIZON2020 program (Grant Agreement Number: 643084) and consists of 14 full partners and seven associated partners out of 11 countries (Austria, Australia, Canada, Czech Republic, Denmark, France, Germany, Israel, Italy, Poland, Slovak Republic) among them internationally leading researchers in the field of geology, chemistry and isotope geochemistry, marine biology and ecology as well as numerical modelling and engineering.

All positions are full-time and fixed term for 3 years, starting in summer/autumn 2015. The salary follows the MSCA-ITN and local rules (annual salary ranges from 35,000 to 57,000 €/yr depending on host university/country, and in case of family obligations additionally 6000,-€).

Successful applicants will benefit from training and networking program delivered jointly by academic and non-academic partners. As a result, *BASE-LiNE Earth* fellows will gain both, research experience and complementary skills such as career planning, communicating science, and management techniques. Researchers will mainly work in their host institution, but they will also have the possibility to visit (an)other *BASE-LiNE Earth* partner(s) for secondment(s). Successful candidates are expected to be an active part within the *BASE-LiNE Earth* consortium by participating in network wide activities such as workshops and conferences.

Applicants of any nationality are welcome. In order to be eligible, each applicant must simultaneously fulfil the following criteria at the time of recruitment: (i) MUST not have resided or carried out his/her main activity (e. g. work, studies) in the country of the host organization for more than 12 months in the 3 years. (ii) MUST hold a Master degree or equivalent has NOT yet been awarded a doctorate degree, and is in the first 4 years (full-time equivalent) of his/her research career. Applicants are encouraged to check their eligibility before submitting their proposal.

Please submit your complete application (including a CV [max. 3 pages], a letter of motivation for the position and a statement of your research interests [max. 1 page], relevant certificates, plus contact details of at least two referees) to the contact of the host institution linked to the subject of your choice quoting *BASE-LiNE Earth ESRxx*. You can apply for more than one project, but in this instance please send a separate application for each position. Closing date for submission is May 31st 2015.

To learn more about *BASE-LiNE Earth* visit <https://www.baseline-earth.eu>.

ESR01—PhD position

Brachiopods from modern and Phanerozoic habitats: Archives of spatial and temporal variations

CONTACT: Maria Aleksandra Bitner, Polish Academy of Sciences, Poland, e-mail: [bitner\(at\)twarda.pan.pl](mailto:bitner(at)twarda.pan.pl)

SHORT DESCRIPTION: The aim of this PhD project is to study elemental and isotopic composition (with a focus on oxygen, carbon and magnesium) in modern brachiopod shells from various natural and laboratory controlled habitats, and using them for proxy calibration. The obtained results will be used for reconstruction of ancient environments and climates based on fossil brachiopod studies.

FULL JOB DESCRIPTION see [here](#)

ESR02—PhD position

Evaluating the biomineralization and chemical differentiation of modern brachiopod archives

CONTACT: Claire Rollion-Bard, Institut de physique du globe de Paris (IPGP), France, e-mail: [rollion\(at\)ipgp.fr](mailto:rollion(at)ipgp.fr)

SHORT DESCRIPTION: This PhD project focuses on the determination of the biomineralization processes and their impact on geochemical proxies in brachiopods in order to evaluate their potential use as a chemical archive for geochemical proxies in ancient seawater. Measurements will essentially be performed on brachiopod specimen grown under controlled laboratory conditions (T, pH). The ultimate goal is to decipher the vital effects on the proxy record.

FULL JOB DESCRIPTION see [here](#)

ESR03—PhD position

The macro-structure of modern and fossil brachiopod archives

CONTACT: Lucia Angiolini, Università degli Studi di Milano, Italy, e-mail:
[lucia.angiolini\(at\)unimi.it](mailto:lucia.angiolini@unimi.it)

SHORT DESCRIPTION: This PhD project examines the macro- and chemico-structure of modern and fossil brachiopod shells to reconstruct evolutionary changes and fabric differentiation of the main brachiopod classes during the Phanerozoic, and to test their veracity in withstanding post-depositional alteration. This will be achieved through a combination of methods involving field collections, systematics, SEM ultrastructural analyses and geochemical trace-isotope analyses. The goal is to test the brachiopod archive's potential for reconstructing the chemical evolution of Phanerozoic seawater.

FULL JOB DESCRIPTION see [here](#)

ESR04—PhD position

Magnesium isotopes in Phanerozoic brachiopods: Implications for the oceanic Magnesium cycle, hydrothermal fluxes, and dolomitization events

CONTACT: Michael Komárek, Czech University of Life Sciences, Czech Republic,
[komarek\(at\)fzp.czu.cz](mailto:komarek@fzp.czu.cz)

SHORT DESCRIPTION: This PhD project generates a Phanerozoic marine Mg isotope record, based on the analysis of $\delta^{26}\text{Mg}$ values in calcitic shells of modern and fossil brachiopods. The inferred $\delta^{26}\text{Mg}$ record of Phanerozoic seawater will then be used to reconstruct and model the history of hydrothermal activity and/or dolomite formation in the Phanerozoic oceans with implications for the evolution of marine Mg/Ca ratio over geological time.

FULL JOB DESCRIPTION see [here](#)

ESR05—PhD position

Lithium isotopes in Phanerozoic brachiopod shells: Implications for the continental weathering flux

CONTACT: Tomáš Magna, Czech Geological Survey, Czech Republic, e-mail: [tomas.magna\(at\)geology.cz](mailto:tomas.magna@geology.cz)

SHORT DESCRIPTION: This PhD project generates a Phanerozoic marine lithium (Li) isotope record, based on the analysis of lithium isotope ($\delta^7\text{Li}$) values in calcitic shells of modern and fossil brachiopods. This will extend and complete the existing information on the evolution of seawater $\delta^7\text{Li}$ and Li/Ca ratios. The latter knowledge will provide important quantitative information on continental weathering fluxes throughout the Phanerozoic with implications for the Earth's global atmospheric CO_2 budget and paleo-climate history.

FULL JOB DESCRIPTION see [here](#)

ESR06—PhD position

High resolution isotope and trace element ratios during the Triassic/Jurassic mass-extinction

CONTACT: Adam Tomašových Slovak Academy of Sciences, Slovakia, e-mail: [Adam.Tomasovych\(at\)savba.sk](mailto:Adam.Tomasovych@savba.sk)

SHORT DESCRIPTION: This project will focus on the documentation of temporal and spatial changes in temperature and seawater chemistry across the Triassic/Jurassic boundary (~200 Million years ago). This particular time is characterized by one of the largest mass extinctions of marine species during the Phanerozoic. We will use brachiopod shells as archive and determine trace element ratios, stable ($\delta^{18}\text{O}$ and $\delta^{13}\text{C}$) as well as traditional and non-tradition isotope systems ($\delta^{11}\text{B}$, $\delta^{26}\text{Mg}$, $\delta^{44/40}\text{Ca}$, clumped isotopes Δ_{47}) in order to gain marine environmental proxy information. Spatially the study will focus on stratigraphic sections in the Northern Calcareous Alps and in the Carpathians.

FULL JOB DESCRIPTION see [here](#)

ESR07—PhD position

Test Chromium and Uranium stable isotopes in brachiopods as a paleo-redox proxy in seawater

CONTACT: Robert Frei, University of Copenhagen, Denmark, e-mail: [robertf\(at\)ign.ku.dk](mailto:robertf@ign.ku.dk)

SHORT DESCRIPTION: This PhD project focuses on the development and use of non-traditional stable isotope systems (chromium and uranium) in brachiopods for their potential use as paleo-redox proxies in seawater. The project is a combination of methods development in the laboratory, a test period in which the systems are applied to control-cultured brachiopods, and an applications part during which the systems is applied on modern and fossil shells and associated carbonates from some important evolutionary periods in Earth' s history. The ultimate goal is to link the systems to continental weathering and to climate change on Earth.

FULL JOB DESCRIPTION see [here](#)

ESR08—PhD position

Clumped isotopes in brachiopods as an indicator of seawater and diagenetic temperatures

CONTACT: Jens Fiebig, Wolfgang Goethe University, Germany, e-mail: [Jens.Fiebig\(at\)em.uni-frankfurt.de](mailto:Jens.Fiebig@em.uni-frankfurt.de)

SHORT DESCRIPTION: This PhD project is focused on clumped isotope analysis of carbonates (e.g. brachiopods). It aims at i) reducing the sample size required for a single analysis applying the common acid bath technique, ii) investigating the temperature dependence of isotopic clumping (Δ_{47}) for brachiopods, iii) reconstructing the temperature and the oxygen isotopic composition of Phanerozoic seawater, iv) determining diagenetic alteration temperatures.

FULL JOB DESCRIPTION see [here](#)

ESR09—PhD position

The micro (μm)- and nano (nm)-structure of modern and fossil brachiopod archives

CONTACT: Erika Griesshaber, Ludwig Maximilian-University, Germany, e-mail: e.griesshaber@lrz.uni-muenchen.de

SHORT DESCRIPTION: The focus of the PhD project will be the investigation of the hybrid nature of modern and fossil brachiopod shells and coral skeletons. This involves: (i) imaging the distribution pattern of the biopolymer matrix within the hard tissue, (ii) characterization of mineral phases that form the skeletal elements and (iii) determination of crystal orientations for an understanding of biological mineralization patterns.

FULL JOB DESCRIPTION see [here](#)

ESR10—PhD position

Variation of Boron element and isotope ratios in Phanerozoic brachiopod shells; Implications for the marine carbonate cycle

CONTACT: Volker Liebetrau, GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany, e-mail: vliebetrau@geomar.de

SHORT DESCRIPTION: This research task will extend the existing Phanerozoic $\delta^{44/40}\text{Ca}$ - and $\delta^{88/86}\text{Sr}$ - records for (i) time series of $\delta^{11}\text{B}$, (ii) and test its reliability as a proxy for continental weathering and pH variations in the ocean. This will have major implications for variations of the changing Phanerozoic carbon cycle.

FULL JOB DESCRIPTION see [here](#)

ESR11—PhD position

Dolomitization of modern and fossil brachiopods - experimental approach

CONTACT: Martin Dietzel, Graz University of Technology, Austria, e-mail: [martin.dietzel\(at\)tugraz.at](mailto:martin.dietzel(at)tugraz.at)

SHORT DESCRIPTION: This project is based on laboratory-controlled dolomitization experiments performed by hydrothermal treatment of brachiopod shells. The evolution of dolomite formation will be monitored by the chemical composition of the aqueous solution as well as the chemical and (micro/nano)structural evolution of the solid throughout the dolomitization and by applying traditional ($\delta^{13}\text{C}$, $\delta^{18}\text{O}$) and non-traditional (e.g. $\delta^{44/40}\text{Ca}$, $\delta^{26/24}\text{Mg}$, $\delta^{88/86}\text{Sr}$, Δ_{47}) stable isotope systems. The study aims to (i) deciphering individual diagenetic reaction pathways, (ii) evaluating the degree of diagenesis and chemical alteration, and (iii) elucidating the implications to isotope records of the Phanerozoic seawater and/or of diagenesis.

FULL JOB DESCRIPTION see [here](#)

ESR12—PhD position

Testing the laser ablation technique for in-situ determination of non-traditional stable isotopes at fine-scale variation in marine brachiopods

CONTACT: Jan Fietzke GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany, e-mail: [jfietzke\(at\)geomar.de](mailto:jfietzke(at)geomar.de)

SHORT DESCRIPTION: This PhD project intends to develop methods using LA-MC-ICP-MS (Laser Ablation Multi Collector Inductively Coupled Plasma Mass Spectrometry) for the spatially highly resolved determination (named “isotope imaging”) of non-traditional stable isotope (e.g. $\delta^{11}\text{B}$, $\delta^{44/40}\text{Ca}$, $\delta^{26/24}\text{Mg}$, $\delta^{88/86}\text{Sr}$) ratios on carbonate samples. The main goal is the acquisition of representative isotopic images in pristine sample material to allow for evaluation of systematic variations of non-traditional stable isotopes and relate them to morphological features (e.g. growth increments).

FULL JOB DESCRIPTION see [here](#)

ESR13—PhD position

From warm to cold: High resolution trace element and isotope ratios during the late Miocene and the Pliocene/Pleistocene transition from ancient warm to modern cold climates

CONTACT: Boaz Lazar Hebrew University Jerusalem, Israel, e-mail: boaz.lazar@mail.huji.ac.il

SHORT DESCRIPTION: This PhD project focuses on the development and use of non-traditional stable isotope systems of mainly Calcium (Ca, $\delta^{44/40}\text{Ca}$) and Strontium (Sr, $\delta^{88/86}\text{Sr}$) in brachiopods and pectinids for their potential use as proxies for the geochemical evolution of Phanerozoic seawater. In particular we aim to investigate two important Phanerozoic time intervals: (i) the upper Miocene post-Messinian Salinity Crisis (MSC) and (ii) the warm/cold Pliocene/Pleistocene transition in the circum-Mediterranean in comparison to a large oceanic basin such as the Pacific Ocean (e.g. brachiopods of the Careaga sandstone, Upper Pliocene, California).

FULL JOB DESCRIPTION see [here](#)

ESR14—PhD position

Calibration of elemental and isotope proxies by inorganic precipitation experiment

CONTACT: Albrecht Leis Joanneum Research Forschungsgesellschaft MBH, Austria, e-mail: albrecht.leis@joanneum.at

SHORT DESCRIPTION: This PhD project focuses on the element discrimination and isotope fractionation processes in inorganic calcium carbonates precipitated under laboratory controlled conditions. A main task is the impact of organic acids on carbonate precipitation and proxy signals. The evolution of carbonate formation will be monitored by using elemental ratios and applying traditional ($\delta^{13}\text{C}$, $\delta^{18}\text{O}$) and non-traditional (e.g. $\delta^7\text{Li}$, $\delta^{11}\text{B}$, $\delta^{44/40}\text{Ca}$, $\delta^{26/24}\text{Mg}$, $\delta^{88/86}\text{Sr}$, Δ_{47}) stable isotope systems. Emphasis will be given on the partitioning of redox-sensitive elements (e.g. Cr, U) and related isotope systems ($\delta^{53/52}\text{Cr}$, $\delta^{238/235}\text{U}$) in artificially precipitated calcium carbonate phases.

FULL JOB DESCRIPTION see [here](#)

ESR15 ESR/ PhD position

Increasing ion efficiency and reproducibility of divalent cations for plasma mass spectrometry

CONTACT: Claudia Bouman Thermo Fisher Scientific (Bremen) GmbH, Germany, e-mail: claudia.bouman@thermofisher.com

SHORT DESCRIPTION:

Clumped isotope ratio mass spectrometry applied to molecular species opens the door to address new applications in paleoceanography, marine biogeochemistry, biomedicine, isotope forensics and maybe also to study of metabolic processes. However, the complexity of the high mass resolution mass spectra requires new evaluation strategies as well as the development of innovative analytical protocols to utilize and to extract all information accessible from the mass spectrum.

FULL JOB DESCRIPTION see [here](#)

Please do not hesitate to contact D. Henkel (dhenkel@geomar.de) for further information.