5 Postdoctoral Researcher positions (m/w/d): Earth Systems Sciences

Naturwissenschaftliche Fakultät, Erlangen, TV-L E , A 13, Full time, Temporary employment: 60 months, Bewerbungsschluss: 09.04.2026

Your Workplace

Earth System Research and Training at FAU

This project is part of a broader initiative to strengthen Earth system science within Europe. Recent national and international reports have highlighted the need to increase research and training opportunities in the Earth sciences, with more emphasis on systems thinking and interdisciplinarity. Addressing today's environmental challenges requires engagement across temporal and spatial scales and at the interfaces between Earth system spheres (atmosphere, biosphere, geosphere, hydrosphere), while also fostering collaboration with the social sciences and humanities. Effective communication of complex findings are essential to ensure knowledge is transferred beyond the scientific community. Science diplomacy provides the necessary framework for understanding how scientific knowledge informs international negotiations and policy in order to address global challenges that cannot be addressed within a single country or discipline.

At the Department of Geography and Geosciences at FAU climate research is a key focal point. Our work encompasses a broad spectrum: from reconstructing geochemical cycles and characterising biodiversity crises in deep time, to studying water and weather systems over recent decades, to future projections, with remote sensing, climate modeling, and biodiversity modeling. The Science Diplomacy Lab at FAU is a new initiative that aims to support training and research linking Earth system science to science policy and diplomacy.

Job Benefits

- Regelmäßiger Stufenanstieg und steigendes Gehalt nach Tarifvertrag für den öffentlichen Dienst der Länder (TV-L) beziehungsweise Besoldung nach BayBesG sowie zusätzliche Jahressonderzahlung
- Urlaubsanspruch von 30 Tagen pro Kalenderjahr bei fünf Arbeitstagen pro Woche, mit zusätzlichen freien Tagen am 24. und 31. Dezember
- Betriebliche Altersversorgung sowie vermögenswirksame Leistungen

Description

A new international Masters of Science in Earth System Dynamics and Evolution will provide training in Earth system science and science diplomacy, with an emphasis on inter- and transdisciplinary research. The program is funded by the Elite Network of Bavaria and is a collaboration between Friedrich-Alexander University of Erlangen-Nuremberg (FAU), where the program is based, and the

University of Bayreuth (UBT).

We are seeking **five post docs for up to five years each** to support this initiative. Postdocs in the cohort will undertake independent projects in Earth system science and/or science diplomacy in collaboration with a project leader (details below), while also working together on joint teaching initiatives related to the overarching research theme. Postdocs will be mentored and encouraged to pursue their own research ideas. Applicants are expected to apply for research grants, and should show willingness to conduct independent research and pursue a habilitation. A habilitation is an additional degree that can be obtained in Germany, which recognises excellence in research and teaching - it requires engaging in a range of tasks that are relevant to a career in academic research (e.g., publishing, grant writing, teaching, curriculum development, student supervision).

The candidates will teach up to 5 SWS (Semesterwochenstunden), approximately 3-4 contact hours per week during the semester. Candidates will also contribute, in line with career stage and interests, to broader program activities, including student admissions, shared infrastructure initiatives, and networking events.

Qualifications

Five projects are available at FAU, each requiring a different skill set, and applicants may select the project that best matches their expertise.

Project 1 - Atmospheric modeling: from paleoclimates to modern climates

Research: The research focus in this project will be on regional, high-resolution climate modeling. The objective will be to extend approaches for the most recent decades (e.g., WRF driven with reanalysis data) to the paleoclimate perspective. By bridging between both time scales, atmospheric model improvement on the one side, and a better interpretation of climate proxies on the other (e.g., tree rings, marine organisms, soils), should be the major motivation. Also, implementation of specific atmospheric processes into the models through recent AI algorithms will be explored in the model development space.

Teaching: The candidate will be responsible for teaching atmosphere-based courses like climate data analysis, the atmosphere in a paleoclimate context, and climate modeling. Classic seminars on atmospheric topics are also possible, and so is the supervision of BSc and MSc theses.

Required skills:

- PhD in Atmospheric Science/Meteorology, Climatology, Geography, Applied Mathematics/Physics or a related field
- Programming skills (Python, Matlab or similar)
- Strong expertise in climate modeling, especially high-resolution regional modeling, in a paleoclimate context
- Interest in Physics-Informed Machine Learning
- Experience with high-performance computing

- Interest for understanding Earth System processes and their complex interactions
  Advantageous skills:
- Compatibility with modern climate change questions
- Linkage to cryospheric research
- Experience in teaching
  For further information on this sub-project contact: Prof. Dr. Thomas Mölg, Professorship for Climatology, FAU, e-mail: thomas.moelg@fau.de

Project 3 - Geochemical flux exchange between crust and oceans

Research: This project will develop an integrated framework to quantify elemental fluxes associated with seawater interaction in heterogeneous oceanic crust at submarine island arcs. Chemical exchange during mineral dissolution and secondary phase formation exerts a key control on ocean chemistry, yet most existing studies focus on mafic crust, despite the compositional variability from felsic to mafic rocks in arc settings. These environments commonly host hydrothermal systems driven by shallow magmatic activity, which further modify crustal composition and fluid chemistry. We will investigate fluxes of major elements abundant in felsic rocks and seawater, including Si, Mg, Ca, C, and S, by combining elemental concentrations and stable isotope data from altered and unaltered rocks with reaction path and transport modelling. This approach will enable quantification of elemental sources, sinks, and pathways within the ocean-crust system.

Teaching: The candidate will be responsible for supporting training in geochemistry, geochemical modelling, and laboratory and field courses, as well as contributing to the development of a new module in fluid transport modelling techniques.

Required skills:

- PhD in Geochemistry, Geology or a related discipline, with a focus on analytical and modelling approaches
- A strong background and knowledge in fluid-rock interaction processes within the Earth's crust
- Experience in the geochemical and isotope analyses of rocks and minerals (e.g., SIMS, LA-ICP-MS, IRMS, TC/EA, XRF and/or MC-ICP-MS)
  Advantageous skills:
- Experience with thermodynamic modelling software is advantageous (e.g., PHREEQC, GEMS, THERMOCALC, PERPLE_X, etc.)
- Programming skills (e.g., R, Python, C++ or Java)
- Teaching experience in both lab and field courses within the broad field of geosciences
  For further information on this subproject contact: Prof. Dr. Barbara Kleine-Marshall, Professorship for Geochemistry, FAU, e-mail: barbara.kleine-marshall@fau.de.

Project 4 - Modelling alpine hydrology under climate change

Research: This project aims to develop novel modelling approaches that integrate hydrological shifts observed in the Alpine hydrosphere with changes in the atmosphere, cryosphere, geosphere, and biosphere. Building upon results from the SEHAG research unit (https://sehag.ku.de/en/welcome/), we will investigate evidence of the coupled and intertwined responses of Alpine geosystems to climate change. Since the uncertainties inherent in cascaded modelling pose significant challenges for interdisciplinary integration, we will apply advanced model reduction techniques and surrogate models to accelerate Bayesian parameter inference, enabling the identification of key transitions within Earth systems, specifically focusing on Alpine catchments.

Teaching: The candidate will be responsible for supporting training in hydrological and hydrogeological modelling, water quality, and the development of a new module in Soil Science focusing on the critical zone.

Required skills:

- PhD in Geology, Physics, Civil or Environmental Engineering, Applied Mathematics or a related field
- Programming skills (Python, Matlab or similar)
- Experience with distributed and physically based hydrological models
- Interest in Physics-Informed Machine Learning
- Experience with high performance computing
- Willingness establish a research group focusing on alpine hydrology and to pursue a habilitation
  Advantageous skills:

- Background in geomechanics or geotechnics
- Experience in planning and conducting fieldwork in high-alpine environments
  For further information on this sub-project contact: Prof. Dr. Gabriele Chiogna, Professorship for Applied Geology and Modelling of Environmental Systems, FAU, phone: +49 9131 85-23042, e-mail: gabriele.chiogna@fau.de

Project 5 - Phylogenetics and Earth system change

Research: This project will develop approaches to combining evidence across life and Earth systems using statistical phylogenetics as a framework. Evidence of long-term evolutionary processes can come from molecular sequence data, morphology, or fossil occurrences. Meanwhile, evidence of other Earth system processes can come from paleoclimate reconstructions or geochemical proxies. The uncertainties associated with divergent data sources are complex and pose challenges for their integration. We will apply new Bayesian phylodynamic models and explore strategies for propagating uncertainties across spheres, with a view to identifying key transitions in Earth systems through empirical case studies.

Teaching: The candidate will be responsible for supporting training in statistics, programming, and the development of a new module in Earth Systems Data Science, together with the

Department of Data Science at FAU.

Required skills:

- PhD in Biological, Ecology, Paleontology, Geology or a related discipline, with a focus on computational and analytical approaches
- A strong background in statistics
- Programming skills (R, Python, C++ or Java)
- Experience working with relevant empirical databases (e.g., NCBI, Paleobiology Database)
- Experience with high performance computing

Advantageous skills:

- Working knowledge of geochemistry or geochemical cycles
- Experience with Bayesian statistics, statistical phylogenetics, simulations or modelling uncertainties

For further information on this subproject contact: Prof. Dr. Rachel Warnock, Professorship for Systems Paleobiology, FAU, e-mail: rachel.warnock@fau.de

Project 6 - Science diplomacy for Earth system science

Research: This project will develop a research agenda that conceptualizes science diplomacy as a core competency of Earth system science. The project should investigate how scientific knowledge related to different Earth system spheres circulates across national, institutional, and cultural boundaries and how international cooperation shapes responses to global environmental challenges and is shaped by them. Particular attention should be given to Africa–Europe collaborations, including questions of equitable partnership, capacity strengthening, data access, and co-production of knowledge in areas such as climate adaptation, environmental monitoring, land-use change, animal tracking, or transboundary resource management. The aim is to explore how scientific collaboration can address geopolitical tensions and build trust across both national and disciplinary borders.

Teaching: The candidate will be responsible for supporting training in science diplomacy, science communication and Science and Technology Studies and the development of the Science Diplomacy Lab located at the Chair of Science, Technology and Gender Studies at FAU. The Science Diplomacy Lab is an initiative in the making that aims to serve as a platform for training, research, and international engagement, linking Earth system science with diplomacy, policy processes, and equitable global partnerships.

Required skills:

- PhD in Science and Technology Studies, Environmental Humanities, Geography, Anthropology, Political Science, International Relations, History of Science or a related field relevant to science diplomacy and global environmental governance.
- Demonstrated expertise in science diplomacy, the science–policy interface, or international scientific cooperation in the context of global environmental change

- Strong grounding in humanities or social science approaches to knowledge production, including critical perspectives on power, equity, and epistemic justice in global research collaborations
- Experience analyzing how scientific knowledge circulates across cultural, institutional, and geopolitical contexts and shapes environmental decision-making
- Proven experience with interdisciplinary or transdisciplinary research linking Earth system science with societal, political, or cultural dimensions
- Experience with qualitative or mixed-methods research approaches, such as interviews, archival research, discourse analysis, or participatory methods
- Teaching experience or training in science communication, science diplomacy, Science and Technology Studies, environmental humanities, or related areas
  Advantageous skills:
- Interest in Africa–Europe scientific cooperation and the role of research collaboration in addressing geopolitical tensions and building trust
- A BA in the sciences will be advantageous
  For further information on this sub-project contact: Prof. Dr. Maria Rentetzi, Chair of Gender Studies and Technology, FAU, e-mail: maria.rentetzi@fau.de.

  In addition, the candidate should demonstrate the following skills:
- Affinity for interdisciplinary research questions
- Demonstrated capacity for independent research
- Willingness to conduct independent research and pursue a habilitation / habilitation option
- Good reporting and presentation skills
- Excellent level of written and spoken English
- Ability to work independently, to critically assess own results, and to cooperate within a wider research team across disciplines

Supplementary description

We welcome applications from people regardless of their gender, nationality, ethnic or social background, religion, age, disability, sexual orientation, and other identities. Friedrich-Alexander University of Erlangen-Nuremberg (FAU) is actively seeking to increase the representation of women in research and teaching and therefore strongly encourages women to apply for these positions. For your application, please combine your application in a single PDF.

The PDF should comprise:

- Cover letter (indicating which project/position you are applying for, and stating your background and motivation for the project) (max. 1 page)
- CV, including a list of relevant publications (max. 3 pages)
- A short research and teaching concept (max. 2 pages)

- University degree certificates
- Contact details for two potential references

PLEASE CLEARLY STATE IN YOUR COVER LETTER WHICH PROJECT YOU WISH TO APPLY FOR.

Interessiert?

Die vollständige Stellenausschreibung sowie alle Infos zum Bewerbungsverfahren finden Sie hier: