



Freiburg, November 18th, 2021

University of Freiburg
Faculty of Environment
and Natural Resources
Industrial Ecology Group
www.indecol.uni-freiburg.de

Post-doctoral researcher and software developer position for sustainable material futures (each 100% for three (3) years, extension possible)

Two 100% positions, starting earliest on January 1st, 2022

Background

The Industrial Ecology Group at the University of Freiburg is a place where scientists from different disciplines design and assess sustainable futures. The group is part of the Faculty of Environment and Natural Resources, one of 11 faculties at our internationally renowned research university.

The scholars of the Industrial Ecology Group further develop the methods of material flow analysis, life cycle assessment and multi-regional input-output analysis and apply them to relevant case studies to quantify and assess, amongst others, the global potential for material efficiency, the life cycle impacts of emerging breakthrough technologies, and the environmental footprints of organizations. In particular, the group is a global frontrunner in the development of scenarios for material cycles and the circular economy. See www.indecol.uni-freiburg.de/en for our research mission and profile.

In a next major step, we want to link our material cycle models to economic assessments of sustainable development to explore the solution space between national policies and systemic transformation and change at the city as well as the individual level.

Material production now accounts for almost 25% of global GHG. It is also a major driver of land destruction and water use. To better understand the global sustainability transformation of our material use, over the coming years, our group wants to build the *material futures lab*. This lab a collaborative modelling tool for building scenarios of future lifestyles and policies and their impact on material cycles and the circular economy. Here, we want to develop research infrastructure to generate consistent scenarios for future service, product, and material demand. We will apply these models to relevant case studies at the city, regional, national, and global levels and assess a broad array of policy options,

lifestyle changes, and technology for a sustainable circular economy. Particular focus shall be given to ambitious low energy and material demand scenarios, for which a consistent micro and macro-economic description also needs to be developed. The use of natural resource, land, and water shall be included as well as future urban forms and lifestyles.

■ **For moving forward with this research agenda we are seeking for a motivated and talented early career researcher** who holds (or is about to receive) a doctoral degree in a discipline that involves the study of sustainability transformation from a systems perspective using quantitative methods, including socio-metabolic research, industrial ecology, economics, earth system science, planning science, and others. Applicants need to document a track record of scientific publications involving the modelling of behavior, economic sectors, and/or material cycles. Expert knowledge of a higher programming language (C, Python, etc.) is a requirement.

Also, we are seeking for a motivated and talented software developer who holds or is about to receive an MSc or BSc degree in informatics or an equivalent study program and who can demonstrate experience in software development, modularization, testing, version control, and (optional) database development, interactive visualization, and management of multi-user software.

The candidates need to display genuine interest in advancing sustainability science, open science, and in collaborative science (e.g., via the development of computational infrastructure for cumulative research, collaboration in teams, and version management). Very good knowledge of written and spoken English is required. Good team working skills are a prerequisite.

Work description

The scope of the research of the postdoctoral researcher will include:

- Contribute to the conceptual development of the *material futures lab* and implementation of modelling routines for the consistent descriptions of sustainable material futures from an industrial ecology and economic perspective
- Conduct case studies for sustainable material futures that feature a consistent assessment of different policies, lifestyles, and technologies
- Support the other team members in their own *material futures lab* projects and their research skill development

The duties of the programmer include:

- Help modularize, test, and version control the material cycle model code
- Develop databases for efficient and transparent data handling for both input data and model results
- Build up computational infrastructure to allow educated but non-expert scholars to use the model, including thesis students
- Develop data download and visualization interfaces

Working environment and working conditions

The successful candidates will join our international group in Freiburg! Industrial Ecology Freiburg (IEF) is an international research group at the University of Freiburg, Germany. Our activities include systems analysis of sustainable development strategies, method development for sustainability analysis, and policy development for sound material cycles and for sustainable consumption. More info on www.indecol.uni-freiburg.de.

The University of Freiburg and our faculty, in particular, offer an open-minded and diverse work environment. At our faculty, we have a vibrant multi-disciplinary research community. Ample qualification options exist for both the post-doctoral researcher and the programmer, including training on professional skills and soft skills, courses for teaching skills, and conferences.

- Women and colleagues with minority background are especially encouraged to apply!
- The weekly working time and payment is according to the tariff agreement for scientific personnel: 39.5 hrs per week (100%), 30 holidays per year, and payment at levels TVL E-13 (post-doc) and TVL E-10 (software developer).
- Both positions are state-funded.
- The post-doctoral position comes with a teaching duty of two classes per year of 5 ECTS each, and a small amount of administrative duties, like, for instance, organizing a seminar series for our institute.
- The place of work is Freiburg and due to the important role of both the post-doc and the programmer for the group, regular presence in the office is a requirement. Solutions for home office of up to 2 days per week can be arranged for.
- The language for research and teaching is mainly English. German is used in many social settings at the faculty and university level, and non-German speakers are expected to make an effort to acquire some basic language skills during the first years of their stay in Germany.
- The positions are announced for a fixed-term working contract of three (3) years initially, and an extension up to six (6) years in total is possible for the post-doc and five (5) years for the programmer.

More info

For inquiries regarding the position contact Stefan Pauliuk, Tel +49-761-203-98726, email stefan.pauliuk@indecop.uni-freiburg.de. Please submit your application here, by December 15, 2021:

<https://uni-freiburg.de/universitaet/jobs/00001925/> for the post-doc

<https://uni-freiburg.de/universitaet/jobs/00001926/> for the programmer

The deadline may be extended and later applications may still be considered.

Applicants please provide the following documents/information

- Cover letter, stating your motivation and ambition for this work. For the post-doc: Please describe your research vision and your intended research program for the coming years, and explain how your competence and vision fits into the *material futures lab*!
- CV (German or English)
- Core publications and/or doctoral thesis (for the post-doc)
- Relevant professional certificate: BSc for the programmer and Ph.D. for the post-doc
- Documentation of modelling and coding experience, e.g., links to GitHub or GitLab repositories etc. (for both)
- Two reference letters for the programmer and for the post-doc the contact details of two colleagues for me to contact.

The application deadline is open. Review of applications will commence on Dec. 15, and relevant candidates will be interviewed subsequently until an agreement will be reached and the position will be filled.