

The Fraunhofer Institute for Solar Energy Systems ISE is the biggest solar energy research institute in Europe. With our approximately 1.100 employees, we conduct applied research to contribute to the broad application of solar energy, developing new materials, improving technical systems and energy conversion, and creating technological foundations for an efficient and environmentally friendly energy supply.

In our group “Applied Energy Storage Systems” we are looking for a student for

---

## **Bachelor/Master thesis on the development of a simulation framework for nonlinear optimization of PV battery systems in Python**

---

### **General Information:**

Electrical storage systems are one of the key components of the energy transition and the future electrical energy supply system. The technical optimization of a PV battery system and careful dimensioning of its components is essential for the technical systems’ performance and financial viability of battery storage projects. In the group “Applied Storage Systems”, you will support us in the development of a simulation framework for the project planning phase, enabling multi-criteria and non-linear optimization of hybrid power systems. We are looking forward to receiving your application, and would be glad to welcome you soon in our highly motivated team.

Your tasks will be:

- Study and improvement of existing interfaces and data structures
- Development of an object-oriented, flexible and modular simulation environment for the performance evaluation and the optimization of PV battery systems
- Adaption and implementation of metaheuristic algorithms for the multi-objective optimization
- Reporting and analysis of results based on real project specifications and constraints

**What we expect from you:**

- Completed studies in Computer Science, Physics, Mathematics, Electrical Engineering, Microsystems Engineering, Industrial Engineering or similar
- Good knowledge of object-oriented programming in Python, C/C++, Java, or other programming languages is an important requirement
- Knowledge of the energy sector and experience with photovoltaic and battery system technologies. Strong interest on these fields can also be considered
- Experience in modelling and similar simulation work. Previous experience in energy system simulation (e.g., Homer, PVSyst, PVSol, etc.) is not a requirement but will be considered as a plus
- Experience with heuristic or deterministic optimization algorithms is desirable
- You have critical thinking and good analytical problem-solving skills
- Good team working and communication skills. You are responsible, reliable and have the ability to work autonomously
- Good MS-Office skills
- Very good written and spoken English. German is not a prerequisite but an advantage

**Questions related to this position are answered by  
Lluís Millet Biosca, Tel.: +49 761 4588 5793**

**Please, send your application to  
lluis.millet.biosca@ise.fraunhofer.de  
(motivation letter, CV, course transcripts and other certificates attached in PDF  
with max. 10 MB)**

**Heidenhofstraße 2, 79110 Freiburg, Germany  
<http://www.ise.fraunhofer.de>**

Application code number: **ISE-2018-201**