The Institute of Environmental Medicine at the Helmholtz Center Munich is offering a B.Sc./M.Sc. thesis project on the topic:

Meta-analysis of the skin microbiome in Atopic Dermatitis (AD)

We are studying the interaction of humans and their environment in the context of health and disease, with a strong focus on the human microbiome and its bioinformatic and statistical analysis.

Project background: Atopic Dermatitis (AD) is a heterogeneous, inflammatory skin disease affecting approximately 25% of children. It is characterized by red itchy skin lesions and multiple genetic and environmental risk-factors, including an altered skin microbiome. While many studies have found associations between AD, demographic co-factors and the skin microbiome, the results frequently suffer from small sample sizes and limited comparability due to a variety of technical, bioinformatic and statistical methods used. Combining skin microbiome studies in a meta-analysis provides not only the opportunity to increase the sample size, but also to streamline bioinformatic and statistical approaches to detect robust associations between demographic co-factors and AD.

Objective: We would like to perform a meta-analysis of published skin microbiome studies in AD to determine the influence of technical and patient-related factors in the association between the skin microbiome and AD.
The M.Sc. thesis should cover the following aspects:

- Systematic literature review of published skin microbiome studies in AD
- Bioinformatic processing of selected raw microbiome sequencing data
- Statistical analysis of microbiome diversity and composition in relation to technical and biological factors

The main outcome should be a combined dataset with the corresponding biological and technical meta-information. The concrete statistical analyses for the thesis can be tailored according to the student's interests.

We are looking for a motivated student with an interest in microbiome data workflows and epidemiology. Experience with (or strong interest in learning) a programming language is required. We are providing an open and supportive working atmosphere with scientists of diverse backgrounds.
If you are interested, please contact luise.rauer@tum.de.