

## **M2 stage offer, January 2025 - June 2025**

**Location :** INSERM UMR 1078, 22 Avenue Camille Desmoulins, 29238 Brest

### **Supervisors (to be contacted for applying):**

Anthony HERZIG, Chargé de Recherche, [anthony.herzig@insem.fr](mailto:anthony.herzig@insem.fr)

Amke CALIEBE, Researcher at the University of Kiel, [calibe@medinfo.uni-kiel.de](mailto:calibe@medinfo.uni-kiel.de)

### **Internship title:**

Polygenic Scores for Subtypes of Diseases

**Keywords:** Genetic Epidemiology, multifactorial disease, genome-wide association studies, phenotype heterogeneity, polygenic liability model.

### **Internship description :**

Complex common diseases, like stroke, cancer or Alzheimer disease, have a multi-faceted etiology including the genetic background as well as environmental and lifestyle factors. The aim of polygenic scores (PGS) is to quantify the genetic influences for each individual as accurately as possible. The vision of PGS is to enable personalized preventive risk assessment and therapy development. The performance of PGS for individualized prediction, however, has so far been limited. One reason for that is that diseases often consist of several subtypes which have differing genetic backgrounds but polygenic scores are typically derived and calibrated in very large datasets where information on subtype are missing or ignored. In the proposed project we will investigate if and to what extent the performance of PGS could be improved by generating PGS for subtypes. We will simulate subtypes with varying degrees of genetic overlap to elucidate this question as well as developing statistical methods for tuning polygenic risk scores in the presence of genetic-heterogeneity.

The project will take place in Brest France and will be financed by the SEA-EU alliance. The eventual student will spend two weeks in Kiel (Germany) in February or March working with Amke Caliebe. In April the student will have the opportunity to attend the European Mathematical Genetics meeting in Brest. In June, it may be possible for the student to present their results at a SEA-EU alliance seminar in Cadiz (Spain).

Salary or allowance: 500-600€ per month