



## **Internship opportunity at the French Atomic and Alternative Energy Commission (CEA, Marcoule)**

### **Data analysis and experimental designs in the context of nuclear glass formulation**

Glass formulation for the vitrification of high-level nuclear wastes has been under investigation at CEA for decades. Beside the complexity of its formulation, nuclear glass also needs to meet requirements which are specific to the industrial vitrification process. Consequently, large amounts of data have to be processed, including formulation data, physical and chemical properties, and data related to the vitrification process. Nuclear glass materials contain many components (up to 30) and composition domains are highly constrained, making the analysis and the comparison of experimental domains very challenging.

Once an optimal domain of glass composition has been defined, the design of experiments (DOE) methodology is applied in order to create property-composition predictive models that must be as robust as possible.

In this objective, the student will have to:

- Analyze and compare glass domains of composition, by using statistical techniques such as (for example): hierarchical clustering, principal components analysis, or other relevant methods
- Develop a methodology for building property-composition predictive models
- Evaluate our current methods for generating DOEs and propose axis for improvement

Duration: 4-6 month

Skills: statistics, data analysis, chemometrics, design of experiments

Programming language and computing skills: C++, ODBC, mySQL

Software: JMP (SAS)

Level: Master 2

Location: Marcoule (Gard), about 30km from Avignon

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