

*N/Ref* : FEM/2017-293

## ***Object***

Job description for a “Research Engineer in Applied Mathematics for Industrial Engineering” 12-month temporary contract (M/F)

## ***Company Description***

FRANCE ENERGIES MARINES (FEM), the national reference institute dedicated to research in the field of Marine Renewable Energies (MRE), supports the nascent MRE industrial sector with the means and skills that increase competitiveness by mutualizing research and development costs, reducing risks and accelerating the acquisition of data and knowledge. The principle of this structure is based on a broad public-private partnership involving numerous members including industrials, SMEs, regional authorities, advanced research and training institutions and competitiveness clusters. The headquarters of FEM are located in Brest, France.

As part of its program "**Technology Design Tools for MRE Applications**", FEM is seeking an applied mathematics research engineer specializing in industrial engineering to ensure the development of this competency through collaborative research projects in a mixed industrial/academic context. This research program covers a broad spectrum of skills including structural mechanics, hydrodynamics, thermal analysis, electrical export components, power transformers, control-command laws, etc. The MRE sector is nascent and non-mature. Only the optimization and de-risking of the developed technologies will make the produced electricity competitive. Learning when deploying prototypes and pilot farms is fundamental and is materialized by the analysis of measured data allowing incremental improvements in numerical models used for dimensioning and monitoring. The sought after research engineer will be in charge of managing this theme and its development while also participating in the collaborative research projects thus generated.

## ***Position Description***

Working with the R&D team and under the responsibility of the program manager for “Technology Design Tools for MRE Applications”, the research engineer in applied mathematics for industrial engineering will contribute to the development of this expertise within this research program by intervening in two essential aspects:

- Provide expertise on statistical and probabilistic models as well as numerical methods for estimating variables and associated uncertainties. These skills will be applied directly to the MHM-EMR project with the objective of defining a protocol for deploying sensors, analyzing measurements and numerical learning in order to improve dimensioning, the prevention of accidental events, and the estimation of the lifespan of MRE floating foundation anchoring components. A sound knowledge of measurement systems is therefore desired. These numerical/monitoring skills will be useful over a broad field of action in relation to structural health measuring (SHM) on various materials such as concrete and composites, but also on systems for monitoring the evolution of bio-colonization, oceanic-meteorological data or multi-variate tools to help optimize farms. This particularly transversal competence covering various FEM research programs therefore requires scientific curiosity;
- Ensure a technological watch in his or her field of competence in order to guarantee the relevance of FEM fields of investigation. S/he will participate in the communication of the Institute's know-

how through publications and participation in conferences and symposiums, and will lead internal institute discussions on this topic.

### Activities

Particular tasks will be defined within the research projects themselves but will also include technology monitoring and advising the FEM team on questions of numerical methods and signal analysis, and will include:

- Bibliographic and state-of-the-art research on numerical models, signal analysis and sensor technologies;
- Participate in implementing numerical models;
- Participate in the drafting of proposals for research projects by orienting/proposing investigative directions and identifying appropriate technical and industrial partners;
- Identify appropriate software in order to meet the needs of FEM;
- Provide internal advice on cross-program project activities touching on the candidate's area of expertise;
- Identify and submit publications to reputable scientific conferences in mechanics to ensure visibility for the MRE sector;
- Write technical and commercial proposals;
- Identify avenues for the development of research activities at FEM and provide professional services contributing to the evolution of the institute's strategic plan.

### Candidate Profile

You have an advanced degree in applied mathematics for industrial engineering such as an engineering, masters or doctoral degree. You also have a minimum of 3 years of experience in research, consulting or in an industrial context. Experience in the naval or oil and gas fields would be a definite advantage.

You are polyvalent and have a clear capacity to put into action multidisciplinary approaches. You have a clear interest in and the necessary skills for multidisciplinary studies in a mixed industrial/academic environment.

➤ <b>Education:</b>	➤ <b>Specific skills:</b>
<ul style="list-style-type: none"> <li>▪ Engineering degree in industrial engineering,</li> <li>▪ Doctoral degree in probabilistic statistical modeling or signal analysis,</li> <li>▪ Advanced Masters degree in engineering sciences, specialized in applied mathematics.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Knowledge of statistical models (Markov method, etc.), probabilistic models (Bayesian approach, etc.), learning, interpolation and extrapolation (i.e. Kriging) and model optimization,</li> <li>▪ Knowledge of signal analysis,</li> <li>▪ Knowledge of sensor technologies,</li> <li>▪ Familiarity with general mechanics (structures, fluids),</li> <li>▪ Knowledge of optimization programs (i.e. Mode Frontier), and signal analysis (Matlab, Scilab, Python),</li> <li>▪ Programming skills (Python, Fortran, C++, etc.).</li> </ul>
➤ <b>Professional experience:</b>	➤ <b>Personal qualities:</b>
<ul style="list-style-type: none"> <li>▪ A minimum of 3 years' experience in research, consulting or engineering in an industrial company specializing in numerical modelling and signal analysis, and ideally in a naval or oil and gas discipline.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Strict scientific rigor,</li> <li>▪ Spirit of initiative and multidisciplinary interests,</li> <li>▪ Taste for applied (industrial) research,</li> <li>▪ At ease in expression, argumentation and communication in a collaborative context,</li> <li>▪ At ease in writing and speaking English.</li> </ul>



### ***Practical Information***

Starting date, location: as soon as possible in Brest, France, for a 12-month temporary contract (renewable).

Final date for applications: October 31<sup>st</sup>, 2017

Application process: CV and cover letter with your current and required salary, and in the case of a seconding contract with a member of FEM, the corresponding commitment letter, to the following electronic account: [contact@ite-fem.org](mailto:contact@ite-fem.org)