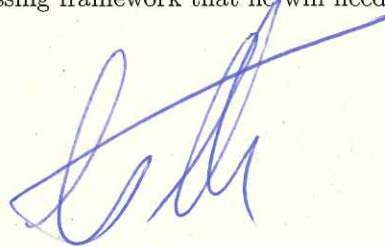


## Report of the tasks carried out at CIMNE by Eric Miranda Neiva

**Tasks performed:** This internship consisted in the first steps to tackle the objectives of Eric's Master thesis and PhD, that involves designing an HPC framework to simulate additive manufacturing processes. The outcomes of his work will be of use for the CIMNE participation in several related research projects, such as CAxMan. The work has been carried out at the Structural mechanics group at CIMNE Barcelona and the Large scale scientific computing group at CIMNE Castelldefels and the main tasks were the following:

- At the Structural mechanics group with professor M. Chiumenti:
  1. Literature review: From the recent numerical simulation of additive manufacturing processes to previous experience in modelling welding and casting processes.
  2. Become a proficient user of COMET, the in-house software for the simulation of thermo-mechanical problems.
  3. Exploration of COMET code and design of an automatic compilation procedure for COMET in Linux.
- At the Large scale scientific computing group with professor S. Badia:
  1. Introduction to FEMPAR as a developer: the in-house software of the group.
  2. Develop a module in FEMPAR to solve multimaterial poisson problems.
  3. Write all the necessary template files to extract the input data for FEMPAR from the COMET problem-types: Eric will solve the same problems in COMET and FEMPAR to verify his implementations. Therefore, it is convenient that he easily generates the same input data adapted to each software.

**Evaluation:** Eric has done an excellent job during the internship and is very motivated with his work. This will lead him to accomplish most of the objectives of his Master thesis. He had to organize his work in two places at the same time and also needed to get into two different softwares that are thought in a completely different way. COMET is a standard Fortran procedural code that uses GiD as a pre- and post-processor, whereas FEMPAR is a complex large scale Fortran object-oriented code that involves an intensive understanding work and uses ParaView as post-processor. In spite of this, he has already been able to implement some modifications into FEMPAR and develop all the pre-processing framework that he will need in his future work.



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