

**Prof. Santiago Badia's Seminar**  
**'Recent advances in large scale finite element solvers' – a critical review**

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Prof. Santiago Badia's seminar was held on Wednesday, 9th November 2016 in the O.C. Zienkiewicz Conference Room, C1 Building of UPC Campus Nord, Barcelona. The speaker is professor of Continuum Mechanics at the UPC and committed researcher at the International Center for Numerical Methods in Engineering (CIMNE), where he leads the Large Scale Scientific Computing department. The main focus of his work is the development, mathematical analysis, and application of numerical methods in engineering and sciences, and high performance scientific computing.

The topic of Prof. Badia's presentation dealt with the recent advances in the development of extremely scalable solvers for linear systems arising from finite element discretization's. As the topic implies, the target audience were professionals from engineering schools and applied sciences as well as recent university graduates and other interested parties.

The first part of the talk gave a concise motivation of solving complex large-scale problems regarding supercomputers in the future. After motivating the topic Prof. Badia presented some multilevel domain decomposition techniques, which he and his team have developed and implemented in the multiphysics and parallel finite element software project FEMPAR. The largest problem solved with FEMPAR to date involved 30 billion unknowns and permits a scalability up to almost 2 million Message Passing Interface (MPI) tasks and half a million processors on the JUQUEEN supercomputer in Europe.

After a short introduction of the the speaker by the moderator, Prof. Badia started right away with his talk. The presentation layout was simple and consistent, including only important key notes, which were explained in detail by Prof. Badia. Also relevant aspects were highlighted in bold letters and on every slide at least one illustration or graph was used, helping the audience to access the complex content. During the whole talk Prof. Badia spoke without using notes but interacted with the illustrations facilitating the understanding of his statements. He seemed very busy with the explanation of the content whereby an interaction with the audience was missing completely. Apparently the familiarity with the subject was assumed, because many acronyms without explanation were used.

After a while it became obvious that the talk won't be finished in the prescribed time and the speaker started to go on very quickly. For those unfamiliar with the topic it was difficult to follow the presentation, because many contents were skipped and thus it was hard to find a red thread. Moreover some of the labels used in the graphs were too small and barely to read.

Undoubtedly Prof. Badia is a true expert in his field and gave an complex overview on the subject. After the talk was finished, he answered some questions satisfyingly but due to time pressure it seemed a little hectic. In the light of the complexity of the issue it would have been preferable, if a longer timeframe would have been given, or less slides would have been used. Furthermore a short glimpse of the current subtopic would have been useful by showing the table of content to follow the speaker's thread.

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