CRITICIZE REPORT
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When you see something that is technically sweet, you go ahead and do it and argue about it only after you have had your technical success. **Dr. Mariano Vazquez**, delivered the Biomedical Research seminar on '**Fully Coupled Fluid Electro-Mechanical Cardiovascular Simulations**.' He carried out analysis and simulations on his heart which is an extremely complex multi-physics problem. Electrophysiology is modelled by a time dependent diffusion equation with a nonlinear term involving. The heart is coupled to mechanical deformation through a complex electro-mechanical model. This solid mechanics problem is coupled to an incompressible flow motion (Blood Flow) through ALE.

Not all problems have a technological answer, but when they do, that is the more lasting solution. I appreciate his hard work on performing simulations on multi physics complex coupled geometry like 'Heart', are more long lasting solution to study behaviour of heart, heart beats and pumping of blood flow every second; which requires to consider lot of hypothetical constraints for analysing high order nonlinear equations. The slides were perfectly organized highlighting and he explained the algorithm of complex coupled geometries, domain discretization, and shown many animations of simulated Heart. Mainly, the computational aspects that is the Relation between Electrical Propagation to Mechanical Deformation and Fluid Mesh Deformation to Blood Flow (Incompressible Flow) was explained in graphical approach.

I think some of the points could be delivered in more concise manner such as Meshing Topology, Boundary Conditions and Sub-Domain Discretization. In slides, he hasn't mentioned the nonlinear diffusion equations, Relation between the Mesh geometry and Analysis geometry. This topics, are the strong base layout of simulations. Boundary conditions were not justified thoroughly; elaboration were mandatory to show results. The simulated animation of Heart gave basic knowledge of results performed by speaker but failed to explain their exact function considering normal heart. Last but not least, he referred Newtonian fluid as the main fluid for simulations, but actually Non-Newtonian fluid was used to perform simulations.

The simulation plays very crucial role in analysing the Heart, but the speaker failed to delivered the pre-processing. He explained the post processing, but not too that extent. Finally, Simulations on biomedical terms are very crucial to know the human body functioning at different situations and conditions. And this led us to be more precise about human parts.