Computer Simulation in Physics and Beyond. What Is Important "Beyond"?

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Each new computing platform requires software developers to analyze algorithms over and over, each time having to answer the same two questions. Does an algorithm possess the necessary properties to meet the architectural requirements? How can an algorithm be converted so that the necessary properties can be easily reflected in parallel programs? And the situation is the same in physics, chemistry, astronomy, in all subject areas… *Changes in computer architecture do not change algorithms*, but this analysis has to be performed again and again when a program is ported from a one type of computers to another, largely repeating the work that has been done previously. Is it possible to do the analysis “once and for all,” describing all of the key properties of algorithms so that all of the necessary information can be gleaned from this description any time a new architecture appears? Yes, this is exactly what the AlgoWIki approach proposes. Details will be presented in the talk.

Another closely related serious question is the choice of computer architecture for efficient solving a particular problem. The main disadvantage of the existing approaches to compare computer platforms based on the Top500, Graph500 and HPCG lists is the too limited choice of algorithms underlying the lists. The AlgoWiki project is dedicated to describing the parallel structure and key features of various algorithms from different areas so we can substantially improve comparing computing platforms and move from the three points to analysis based on hundreds of various algorithms. AlgoWiki gives almost unlimited freedom to compare various computing platforms.