

Propositions

accompanying this dissertation

On Application Design for Manycore Processing Systems in the domain of Neuroscience

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1. A biologically-accurate simulator exhibits performance patterns that are dictated by problem size and the nature of each network's connectivity map (this thesis).
2. The vast diversity of approaches in the neuromodeling field does not permit for a homogeneous acceleration platform to effectively address the complete array of modeling requirements (this thesis).
3. The Xeon Phi manycore processors appear most suitable for large-scale simulations, with millions of biologically-detailed neurons and dense interconnectivity between them, as long as distribution of the neuronal gap-junctions is not "chaotic" and neurons form bonds with preference to adjacent neurons in the 3D plane (this thesis).
4. Since cycle-accurate simulators behave in a stable manner after initial warm-up steps, it is beneficial to reduce the amount of simulation steps and increase the range of parameters explored when evaluating optimal simulator configurations for heavy workloads and long simulation times (this thesis).
5. Cloud services lend themselves to performing parameter-space explorations by offering processing resources that can be scaled to match problem size in a cost-efficient manner and are otherwise difficult to access (this thesis).
6. Interdisciplinary research is the task of building a bridge made out of a mishmash of different materials, without a proper manual and all builders speaking 10 different languages.
7. Academic software development has a lot to learn from its industrial counterparts – notions such as testing, quality control and clean code are a given in the industry, but a luxury in academia.
8. "Nothing in life is to be feared, it is only to be understood; now is the time to understand more, so that we may fear less." – Marie Curie
9. "An expert is a person who has made all the mistakes that can be made in a very narrow field." – Niels Bohr
10. "I suppose it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail." – Abraham Maslow
11. "The cake is a lie." (Portal)