

Athens

November 29, 2011

Swanson Lab,  
Div. of Neuropathology,  
Department of Pathology,  
University of Washington

Dear Professor Kristin Swanson,

This letter is to express my interest in applying for the research scientist position at the Swanson Laboratory. My name is Nikolaos Vlassopoulos and I was until recently employed as a post-doctoral researcher in the [MaIA](#) team at [LORIA](#), INRIA Nancy. Regarding my background studies, I hold a degree (“Ptychion”) in Physics from the [Physics](#) department of the [National and Kapodistrian University of Athens](#) and a two year interdisciplinary MSc ([Physics](#) and [Informatics](#) departments) in Electronic Automation from the same university. I received my PhD from the Physics department, subdivision of applied physics, in 2008. The subject of my thesis was on parallel algorithms and architectures and more specifically on efficient parallel memory accessing techniques for Fast Fourier Transforms. During the course of my thesis I have studied and conducted research on several topics, ranging from graph labeling algorithms on two-dimensional meshes of processors, to parallel and distributed numerical computations. Further, I have participated in several projects and I have substantial experience in design and implementation of hardware algorithms and architectures with application in several fields.

My interest in mathematical modeling of biological systems stems from my background as a physicist, my work as a post-doctoral researcher, but also from my participation in workshops, such as “Statistical Physics and Biology of Collective Motion” (COLMOT10), which have been a great inspiration for me. I consider the overall modeling process, starting from the initial attempts to understand, simplify through assumptions, and model the underlying dynamics, and up to verifying and refining a model through experimental data, extremely creative. Needless to say that, the perspective of not only investigating theoretical models, but also studying the possibility of their clinical applications, especially on such an important field as controlling tumor growth, is extremely interesting and exciting. Finally, I believe that working in a research laboratory, such as Swanson Lab, will give me the opportunity to study in-depth, and perform original research on one of my main research interest areas, id est, mathematical modeling of

biological systems.

Regarding my experience and data analytic skills, I have a strong theoretical background that combines several different fields. I have studied, independently of my degrees, several topics, mostly in Mathematics. As a result, I am familiar with, and have worked on several topics, including (but not limited to): Real and Complex Analysis, Differential Equations, Discrete Mathematics, Combinatorics, Measure Theory, Probability Theory, Markov Processes, (basic) Stochastic differential equations, Graph Theory and Logic. During my post-doctoral work, I have acquired some experience in system modeling with cellular automata, and also in multi-agent systems. Further, I am particularly interested in reaction-diffusion processes, both from an analytical point of view, but also through the study of their realizations with cellular automata. Finally, my studies in Physics have equipped me with a rich background, tools and methodologies for modeling physical systems, as for example methods from, e.g., Statistical Physics, Thermodynamics and so on, that, I believe, will prove of great value in the context of mathematical modeling.

I am really enthusiastic about learning new things, exploring new fields and facing new challenges. In fact, challenging problems is what I value most in my work, and I am not afraid to face difficult problems that will require increased effort to solve. I consider one of my strong points my ability to combine knowledge and methods from different fields when facing a new problem, as well as the ability to approach a problem from several different perspectives and quickly switch perspective if the current one proves inadequate. Finally, I am not afraid of trying to approach a problem from entirely new directions, introducing new concepts and building a new theory, when all other approaches do not give adequate results.

Regarding my programming skills, I have a substantial experience in most major programming languages, as for example C/C++, Java and Python. Further, I have previously worked with several tools like Matlab / Octave. I have a solid knowledge in algorithms, both for sequential and parallel / distributed machines, as well as significant experience in numerical simulations, system modeling and numerical methods, but also on visualizing experimental data. Finally, I have a substantial experience in digital hardware design using Field Programmable Gate Arrays or Application Specific Integrated Circuits, and I have used hardware platforms to speed-up numerical simu-

lations in several occasions.

Sincerely yours,

Nikolaos Vlassopoulos