

Stavros-Richard G. Christopoulos
strichr@yahoo.gr
Manto Mavrogenous 10, 124 61 Haidari, GREECE
(+30) 210 5822216, (+30) 6948 107 188

Feb 28, 2014

Professor Dr. Heiner Igel
Department of Earth and Environmental Sciences
Geophysics Section, Seismology Group
Ludwig-Maximilians-University
Munich, Germany

Dear Professor,

I am writing to apply for the Post-Doctoral position in the Department of Earth Sciences, at University of Oxford. I am a Ph.D. Candidate at the Physics Department of the National and Kapodistrian University of Athens completing my Ph.D. Thesis, entitled “Complex Dynamical Systems and Natural Time. Applications to Seismicity”, under the supervision of Associate Professor Nicholas V. Sarlis. I expect to complete my Ph.D. by July 2014.

My research is focused on Earthquake Physics using aspects of natural time analysis, recently introduced by Varotsos, Sarlis and Skordas [[*Natural Time Analysis: The new view of time. Precursory Seismic Electric Signals, Earthquakes and other Complex Time-Series* \(Springer-Verlag, Berlin Heidelberg\) 2011](#)]. Using this method, I studied the global seismicity as described by the Centennial Earthquake Catalog and identified correlations between successive earthquake magnitudes for events greater or equal to M7. Together with my supervisor, I have co-authored a paper [[*N. V. Sarlis and S.-R. G. Christopoulos, “Natural time analysis of the Centennial Earthquake Catalog”, Chaos: An Interdisciplinary Journal of Nonlinear Science 22, 023123 \(2012\), doi: 10.1063/1.4711374*](#)] showing that these correlations are beyond chance and thus the solid Earth crust should be considered as a single complex system. This, further triggered my interest in Earthquake Physics, so I studied the coherent noise model introduced by Newman and Sneppen, which, among others, can adequately model aftershock time series. Using a semi-analytical approach, I investigated, together with my supervisor, the predictability

of this model. The results [[N. V. Sarlis and S.-R. G. Christopoulos, “Predictability of the coherent-noise model and its applications”, Physical Review E statistical, nonlinear, and soft matter physics 85, 051136 \(2012\), doi: 10.1103/PhysRevE.85.051136](#)] indicate that not only the coherent noise model exhibits predictability but it can also be used for the construction of a prediction algorithm for the earthquake magnitudes in real aftershock time series. The latter result led us to use the Receiver Operating Characteristics (ROC) diagram to predict the aftershock earthquake magnitude since in natural time this task reduces to binary prediction. Recently, I have co-authored a paper [[N. V. Sarlis and S.-R. G. Christopoulos, “Visualization of the significance of Receiver Operating Characteristics based on confidence ellipses”, Computer Physics Communications 185, 1172–1176 \(2014\), doi: 10.1016/j.cpc.2013.12.009](#)] that estimates the confidence intervals in ROC. Additionally, I studied the application of the aforementioned aftershock magnitude prediction method to global seismicity and a relevant paper has been recently submitted for publication. Moreover, the investigation of the coherent noise model in natural time has led to relaxation properties, which may also be shared by other complex systems, describing off equilibrium dynamics (a paper describing these results is currently under review).

My research so far has increased my interest on Earth Sciences and this is why I'm applying for this Post-Doctoral position, since it will give me the chance to further study seismology as a member of your research group, using innovative technology.

I believe I am a suitable candidate for this Post-Doctoral position as I am a competent researcher using analytical and semi-analytical methods supported by numerical calculations. Moreover, during my M.Sc. Thesis in the Department of Physics, at the National Technical University of Athens on laser physics, I have developed my laboratory skills. Finally, my teaching experience includes supervising first year students carrying out experiments in the laboratory in the Physics Department of the National and Kapodistrian University of Athens.

Please find attached my curriculum vitae and the names and addresses of three references.

Thank you for considering my application and I look forward to hearing from you.

Yours sincerely,

Stavros-Richard G. Christopoulos