

## Report

By Prof. DSci. Stefan Kanchev Stefanov

On the open academic position for "Professor" at the Institute of Information and Communication Technologies BAS, Professional field : 4.5 Mathematics, speciality "Mathematical Modeling and Application of Mathematics (Monte Carlo and Quasi-Monte Carlo Algorithms and Applications)", published in the Bulgarian State Gazette no. 41 / 21.05.2019

### 1. General description

The only candidate applying for the open position, Assoc. Prof. Todor Vasilev Gyurov, submitted all the necessary documents and a list of 26 scientific publications that were published after 2004 - the year in which he became an associate professor. Copies of the full text of all publications are provided. The applicant has provided a detailed record of all works. Four of the publications are in international journals with impact factor; 18 articles have SJR index; there is one book chapter and 3 publications are visible in SCOPUS without SJR. The submitted works are co-authored with both Bulgarian and foreign scholars, in 5 of them Assoc. Prof. Gyurov being the lead author (the first in the list of authors), what indicates that the candidate has a decisive or equal contribution to these studies. According to the fulfillment of the indicators for minimum requirements A, B, C and D for publishing activity, Assoc. Prof. Gyurov significantly exceeds the minimum requirements for occupying the academic position of "professor". The sum of the points in Group E obtained from independent quotations of his works is 444 points, which exceeds the minimum requirements more than 3 times. Particularly striking is Group E indicators related to the management and implementation of research projects - the sum of points is 630, exceeding more than four times the minimum requirements. I will especially note the leadership of the Bulgarian teams in 7 international and 4 national scientific and educational projects. This illustrates his extensive management experience in successfully leading research teams, which is a major plus for the benefit of the applicant.

The scientific problems discussed and the tasks solved in the submitted publications are within the scientific specialty of the announced position.

## 2. Contributions

The papers presented for the open position have been published between 2004 and 2018 inclusive. During this period, Assoc. Prof. Todor Gyurov is already an established researcher with interests in several scientific and applied fields, which form a complex area related to the area of scientific computing on high-performance computing system with parallel organization. Initially, as a specialist in the development of numerical Monte Carlo methods and algorithms and their application in various fields of physics, he and his colleagues and co-authors have successfully dealt with the complex task of continuing and transferring and developing particular classes of Monte Carlo methods for parallel calculations and simulations of problems and phenomena in the physics of quantum transfer, calculation of multidimensional integrals with various applications etc. His research on the scalability and energy efficiency of intensive Monte Carlo and quasi-Monte Carlo methods on supercomputer systems is of interest. All these results are summarized in the submission of the applicant's contribution and original results obtained in the various publications. The information provided correctly reflects the applicant's achievements and I accept the conclusions drawn therein. Without listing and repeating the contributions noted in the report that detail the applicant's diverse scientific and applied activities, I will draw attention to the importance of a Monte Carlo model algorithm developed by the applicant and his colleagues, namely the SALUTE application (Stochastic ALgorithms for Ultra-fast Transport in sEmiconductors) for solving quantum-kinetic equations on clusters of the European grid structure EGI. This is a modern approach to maximize the capabilities of Monte Carlo methods that demonstrate their maximum capability on massive data tasks. Such a large volume data tasks can be numerically solved by using supercomputers or grid systems.

Another recent trend, in which the applicant has been working lately, is adapting and developing parallel Monte Carlo algorithms for their application on GPUs and Intel Xeon Phi co-processors. Another important activity to be noted is the management of international (7) and national (4) projects, all successfully completed. This activity demonstrates his ability to work with other colleagues and to guide young scientists at an early stage in their professional career. In general, I have no negative comments on the scientific and applied activity of Assoc. Prof. Todor Gyurov. The small technical inaccuracies found in some of the documents presented do not alter the overall conclusion of his activity.

### 3. Conclusion

The documents presented and the analysis made in the foregoing points of the report clearly show that the candidate for the announced open position Assoc. Prof. Todor Vasilev Gyurov fully complies with the requirements of the ZRARB, the Rules for the implementation of the ZRARB and the Rules for the structure, activity and internal order at the Institute of Information and Communication Technologies at the Bulgarian Academy of Sciences. The achieved scientific and applied results give me reason to propose Assoc. Prof. Todor Vasilev Gyurov to be elected to the academic position of "Professor" at the Institute of Information and Communication Technologies at BAS in the professional field 4.5 Mathematics, specialty "Mathematical Modeling and Application of Mathematics (Monte Carlo Methods and Quasi-Monte Carlo Algorithms and Applications)". My conclusion about the occupation of the academic position "Professor" by Assoc. Prof. Todor Vasilev Gyurov is POSITIVE

08/20/2019

Sofia

Signature:



/ Prof. D.Sci. Stefan K. Stefanov /