STANDPOINT

for the competition for the academic position of "professor" in the professional field 4.5. Mathematics, major in "Computational Mathematics (High Performance Calculations)", announced in State Newspaper no. 41 / 21.05.2019 for the needs of the Grid Technologies and Applications Section (now High Performance Systems, Networks and Algorithms) of the Institute of Information and Communication Technologies (IICT) at BAS

by Prof. DSc Maroussia Nikiforova Bojkova, Department of Probabilities, Operational Research and Statistics at the Sofia University

This standpoint was written and submitted on the basis of Order No. 177 / 19.07.2019 of the Director of IICT-BAS Prof. D.Sc. Galya Angelova and the decision of the first meeting of the scientific jury on the procedure. It has been prepared in accordance with the requirements of the Law for the Development of Academic Staff (ZRASRB), the Regulations for the implementation of the ZRASRB, the Statute of BAS, the Law on BAS and its Regulations for the conditions and procedure for acquiring academic degrees and for occupying academic positions in BAS and the Regulations on the specific conditions for acquiring degrees and occupation of academic positions at IICT-BAS.

Assistant Professor Dr. Emanuel Yordanov Atanassov is the only candidate in the competition.

1. General description of the competition documents

To participate in the competition, the applicant submitted a list of 21 publications in foreign scientific journals and scientific forums. Other 12 documents were also submitted (in the form of a curriculum vitae in the European format, a copy of the diploma for the educational and scientific degree "doctor"; a certificate from the employer, a copy of the diploma for associate professor, a list of citations, summaries of scientific publications, with which the candidate participates in the competition - in Bulgarian and English; a reference for the fulfillment of the minimum national requirements of IICT under Article 2b, paragraph 5, drawn up on the basis of documents submitted for the competition; a reference to the original scientific and scientific-applied contributions of the candidate; declration that there is no proof of plagiarism in scientific works, a list of projects under the competition), supporting the applicant's achievements. All documents have been carefully prepared and fully correspond to the requirements of the above mentioned normative acts.

2. General characteristics of the submitted scientific works

To participate in the competition for the academic position of "Professor" 21 scientific publications have been submitted, all of which are visible in the international databases - SCOPUS and / or Web of Science. Of these, 6 articles have Impact Factor (IF), 9 articles with SJR index, as well as articles visible in SCOPUS without SJR Index - 6 issues. All of these publications are after the procedures of acquirement of Ph.D degree and Assoc. Professor (2006) and are written in English.

The submitted scientific publications fulfill in the highest degree and even exceed quantitatively the minimal national requirements (under Art. 2b, para. 2 and 3 of ZRASRB) and also the additional requirements of IICT-BAS for occupying the academic position of "professor" in the scientific field and professional direction of the competition. Plagiarism has not been identified in the scientific papers presented at the competition.

3. Scientific and applied contributions of the applicant in the submitted publications

The presented scientific publications of Assoc. Prof. Atanasov are devoted to various aspects in the field of computational mathematics and could be divided into 4 main groups as follows: classes of algorithms using fine levels of parallelism and heterogeneous computational systems, optimization of high-performance calculations, generation of calculations with low discrepancy, schemes and services for efficient use of distributed computing environments.

• In the field of classes of algorithms using fine levels of parallelism and heterogeneous computing systems, algorithms that use fine-grain parallelism suitable for use on modern heterogeneous computing systems have been theoretically developed, implemented and tested. The motivation for such developments comes primarily from the entry of computational accelerators into today's high-performance computing systems.

• Publications related to the optimization of high-performance computations contain a comparative study of deterministic and randomized algorithms for numerically integrating functions with different smoothness constraints, as well as optimizing an application used in computational chemistry. In particular, it is my pleasure to stress on the vital connection with real-world practice tasks. Methods and metrics have also been developed to evaluate the energy efficiency of algorithms using heterogeneous computing systems, and in addition to the use of electricity, the cost of acquiring the system has been considered.

• The algorithms developed to efficiently generate **modified** low-discrepancy sequences are new and of particular importance which is stemming from the fact that low-discrepancy sequences widely used in various applications instead of pseudorandom number generators leads to a better speed of convergence. Low discrepancy sequences are deterministic constructions uniformly distributed in the single s-dimensional cube, and with appropriate scrambling, such sequences exhibit behavior of random variables and give rise to certain advantages over Monte Carlo and quasi-Monte Carlo methods. One of the most popular sequences of this type are the Sobol and Holton sequences.

• Schemes and services for efficient use of distributed computing environments have been developed for the purposes of the so-called E-Science. Their actuality stems from the infrastructure developed by the European Union, initially organized as Grid and subsequently as Cloud. Such an environment allows for considerable flexibility, including the ability to implement and deploy new services, as well as new schemes for monitoring and allocation of workload, quality of services and more.

The applied contributions of the candidate as a wholeare are related to the operational work of the Avitohol supercomputer with over 400 Teraflop theoretical peak performance, which in 2015 is on the list of the 500 most powerful supercomputers in the world - https://www.top500.org/ sys and implementation of a variety of applications that, in addition to scientific excellence, have significant effects in various fields of public practice.

4. Reflection of scientific publications

Assistant Professor Dr. Emanuil Yordanov Atanassov has enclosed a reference to 46 tations in journals that have been referenced in SCOPUS and WoS. SCOPUS candidate's overall H index is 9.

The applicant is the recipient of 4 international awards, which is indicative of the quality of the applicant's research from the international community.

5. Assessment of personal contribution

All the publications presented in the competition are in co-authorship and the candidate is the first author of 10 of them. For the joint articles I believe that the contribution of Assoc. Prof. Atanassov is no less than the contribution of the other co-authors. The enclosed documents show that the candidate has participated in 13 international scientific and applied projects, mainly under the EC Framework Programs, in 5 of which he is a principal investigator of the Bulgarian team and in 8 national ones, in 2 of which he a principal investigator.

6. Critical notes

I have no critical remarks. Rather, I have a recommendation to the candidate in connection with Art. 2, item 5 of the Law of BAS, which concerns the qualification of a leading researcher, namely in his future work to publish independently, despite the fact that the specifics of the field in which he is working presupposes naturally collective work.

7. Conclusion on the application

Having acquainted myself with the materials and scientific works presented in the competition and on the basis of the analysis of their importance and the scientific and applied contributions contained therein, I confirm that the scientific achievements meet the requirements of the ZRASRB, the Regulations to it, the Statute of BAS, the Law of BAS and its Regulations on the terms and conditions for acquisition of academic degrees and occupation of academic positions in BAS and the Regulations on the specific conditions for acquiring scientific degrees and occupation of academic positions at IICT-BAS for occupation by the applicant of the academic position of "Professor" in the scientific field and professional direction of the competition. In particular, the applicant satisfies the minimal national requirements in the professional field to the highest degree and no plagiarism has been detected in the scientific papers submitted at the competition.

I give my **positive** opinion to the application.

GENERAL CONCLUSION

Based on the above, I recommend to the Scientific jury to propose to the Scientific Council of IICT-BAS to select Associate Professor Dr. Emanuil Yordanov Atanassov to take the academic position of "Professor" in the professional field 4.5. Mathematics, major in Computational Mathematics (High Performance Computing).

Sofia, 17 September 2019

Sign:

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