O P I N I O N

On the procedure for occupation of the academic position "Associate Professor" for the needs of Department „Computer Informatics" in the Faculty of Mathematics and Informatics (FMI) at the Sofia University „St. Kliment Ohridski" (SU)

Professional field 4.6 *Informatics and Computer Science (Programming)*

Announced in State Gazette (issue 21 / 15.03.2022) and the internet pages of FMI and SU

Opinion prepared by: **Prof. Dr. Emanouil Iordanov Atanassov – IICT-BAS,** professional field mathematics, in my capacity as a member of the scientific jury on the procedure according to order № РД 38-232/11.05.2022 г. of the Rector of Sofia University.

Sole candidate is: Assistant Professor Dr. Ivan Georgiev Hristov, FMI of SU "St. Kl. Ohridski"

1. *General characteristics of the presented materials*

The presented materials in the procedure for occupation of the academic position "Associate Professor" are prepared in accordance with the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA), the Regulation for the Application of (DASRBA), as well as with the Rules for the Conditions and Procedure for Acquisition of Scientific Degrees and Occupation of Academic Positions in Sofia University (RCPASDOAPSU). They include:

1) Curriculum Vitae of the applicant; 2) a copy of the master's degree diploma and a copy of the bachelor's degree diploma; 3) a copy of the diploma for PhD; 4) a copy of an employment contract for the academic position of "Assistant professor" and an official note from the Dean of FMI-SU that the applicant is on a principal employment contract; 5) Certificate of work experience in the domain; 6) Documents proving the fulfillment of the requirements under Art. 105, paragraph 1, item 2 of RCPASDOAPSU; 7) Lists of publications (a list of all publications (**37**) and a list of publications submitted for participation in the procedure (**12**); 8) List of publications, scientific conferences, projects and position as scientific supervisor of students as generated by the "Authors" system of Sofia University; 9) Information on fulfillment of the minimum national requirements according to the Regulation for the Application of DASRBA and the requirements of Sofia University for professional field 4.6 "Informatics and Computer Science"; 10) List of observed citations (**7**) with full bibliographic description of the cited and citing publications; 11) Description of the original scientific contributions; 12) References for the fulfillment of the indicators referred to in Article 122, paragraph 2 of RCPASDOAPSU; 13) Copies of the scientific publications submitted for participation in the procedure; 14) Abstracts of the publications in Bulgarian and English; 15) a copy of the notice for the procedure in the State Gazette.

Overall, the documents of Assistant Professor Dr. Ivan Georgiev Hristov on the procedure for occupation of the academic position "Associate Professor" are prepared in **full compliance** with the requirements of the Regulation for the Application of DASRBA and RCPASDOAPSU.

2. *Biographical data*

The candidate Ivan Hristov graduated from the FMI of Sofia University in 2004 with a bachelor's degree in applied mathematics and in 2007 he completed a master's degree in mathematics in the master's program "Computational Mathematics" at the Faculty of Mathematics and Informatics at Sofia University (FMI-SU). In 2014 he received his PhD degree in the professional field 4.5 Mathematics, doctoral program: "Mathematical Modeling and Applied Mathematics". His entire work experience is at FMI of SU, starting in 2007 as an assistant, then senior assistant and chief assistant (assistant professor) in the Department of Mathematical Modeling. Since 2018 he has been an assistant professor in the Department of Computer Informatics at the FMI-SU. Ivan Hristov has two three-month specializations in 2015 and 2017 at the Joint Institute for Nuclear Research (JINR) in Dubna, Russia.

3. *General characteristics of the presented materials of the applicant*

For review in the procedure, the candidate Ivan Hristov presented in full text 12 scientific publications. They do not repeat those included in the previous procedure for obtaining the PhD degree. All publications are visible in the established world databases - SCOPUS and/or Web of Science and have an SJR index.

A list of observed **7** citations of 6 publications of the applicant is presented. These citations ensure the fulfillment of indicator "D" according to the requirements of Regulation for the Application of (DASRBA) for the academic position "Associate Professor". All citations are visible in SCOPUS. The candidate has been a supervisor of the diploma thesis of one student that graduated successfully and leader of the Bulgarian team in 5 scientific projects. He has been a member of the team in 10 other projects in the last 15 years.

In Table 1 one can see how applicant fulfills the scientometric indicators for the academic position of "Associate Professor" in professional field 4.6 "Informatics and Computer Science", according to the requirements of the Regulation for the Application of (DASRBA) and the requirements

TABLE 1: Comparison of the indicators covered by the applicant Dr. Ivan Hristov and the minimum required credits for the academic position "Associate Professor" in professional field 4.6 "*Informatics and Computer Science*" for SU

Group of indicators	Number	Credits covered by Dr. Ivan Hristov	Minimum required credits for "Associate Professor" position
A (PhD dissertation)	PhD Dissertation - 1	50	50
B (publications, monographs)	4 papers	120	100
C (publications)	8 papers	240	200
D(citations)	7 citations	56	50

E (projects, etc.)	Lead projects, participation in the projects	102	-

There is no proven plagiarism of the publications of Ch. Assistant Professor Dr. Ivan Hristov according to the statutory order.

4. General teaching activity

I have no direct observations on the teaching activities of Assistant Professor Ivan Hristov, but from the presented data on his teaching activity in the last 4 years it can be seen, that it is of significant level and mainly in the field of programming in the recent years. In the FMI of Sofia University, the candidate has led the courses: "Introduction to Programming" and "Data Structures and Programming" for the specialties "Applied Mathematics", "Mathematics" and "Statistics".

5. General description of the scientific and scientifically applied contributions of the applicant

The scientific and scientifically applied activity of the applicant and the topics of the presented scientific works are clearly in the field of the competition. The main results obtained in the presented publications are described clearly, logically, and systematically. Brief summaries in English of each of the 12 publications are also presented and the respective contribution of the applicant is outlined.

The main scientific contributions can be grouped as follows:

Development of efficient parallel algorithms using MPI and OpenMP for implementing various numerical methods. MPI and OpenMP are used for applying interpolation methods and difference schemes for solving problems described by the Lorenz system, a system of perturbed 2D sine-Gordon equations, and Hamiltonian systems [1, 2, 3, 4, 5, 6]. The parallel efficiency of algorithms using MPI and OpenMP libraries is tested on HPC resources, including also a supercomputer with coprocessors Xeon Phi.

Numerical simulations of static and dynamic regimes in Josephson junctions [7, 8, 9, 10, 11, and 12]. Algorithms were developed applying difference schemes with finite differences and finite element method for: (1) studying the dynamics of multistacked Josephson junctions using the unified model of Machida and Sakai; (2) studying the phase dynamics of stacks from long Josephson junctions using the Sakai-Bodin-Pedersen model; The described algorithms are implemented in computer programs and numerical results are obtained and analyzed: (1) for the state of the Josephson junctions for values of the external magnetic field and the external current; (2) for the influence of the capacitive coupling on the fluxon dynamics and a comparison is done with the case of inductive interaction; (3) for the phase dynamics of stacks of long Josephson junctions. The critical currents for the individual junctions for different values of the attenuation parameter in weak magnetic field were obtained.

6. *Reflection of the applicant's work in the works of others author.*

The candidate provided information about **7** citations of 6 publications. These citations are in articles by other authors, without self-citations, published in refereed journals and proceedings that are indexed in Scopus. Thus, the requirement for citations is clearly fulfilled.

7. *Evaluation of the applicant's personal contribution*

All the scientific publications submitted for participation in the competition have more than one author. Notably, in 10 of them the candidate is the first author, which suggests that he has leading contribution. Formally, as we do not have written statements, I consider the contributions to be equal. The personal contribution of the candidate is described by the candidate and is without doubt.

8. *Critical remarks*

I consider that the number of citations is relatively small, when considering the substantial number of publications, their level, as well as the places where they are published. Thus, I would suggest for future works to consider carefully where the results should be published and also to choose appropriate conferences, where his works may get more interest.

9. *Personal impressions*

I know Dr. Ivan Hristov since several years, as he was user of our supercomputer Avitohol and other HPC resources. From our discussions I have excellent impression of his understanding of the problems, knowledge, and expertise in the field.

CONCLUSION

After getting acquainted with the presented materials and analyzing their content and the value of the scientific and scientifically applied contributions of the candidate, I confirm that the scientific and other academic achievements of assistant professor Dr. Ivan Georgiev Hristov fulfill the requirements of (DASRBA), and Rules for the Conditions and Procedure for Acquisition of Scientific Degrees and Occupation of Academic Positions in Sofia University (RCPASDOAPSU). In particular, the candidate fulfills the minimum national requirement for the professional field and the additional requirements of Sofia University and there has been no proven plagiarism in his scientific papers. Based on that, I give **positive opinion** of the scientific and scientifically applied contributions of the candidate and I strongly urge the scientific jury to recommend to the Faculty council of the FMI of SU to elect assistant professor Dr. Ivan Georgiev Hristov for the academic position of Associate Professor in professional field **4.6 „Informatics and Computer Science (programming)".**

23.06.2022   Signature: ....

Sofia   /Prof. Dr. Emanouil Atanassov/