

OPINION

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)

On the professional field 4.6 *Informatics and Computer Science (Programming)*

Announced in State Gazette (issue 21 / 15.03.2022)

With sole candidate: Assistant Professor Dr. Ivan Georgiev Hristov

Reviewer: Professor Dr. Todor Gurov from the Institute of Information and Communication Technologies at the Bulgarian Academy of Sciences (IICT-BAS), Member of the scientific jury in accordance with Order № PD 38-232 /11.05.2022 by the Rector of Sofia University

1. General characteristics of the presented materials

The presented materials on 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 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 basic employment contract;
- 5) Certificate of work experience in the specialty;
- 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 in number) and a list of publications submitted for participation in the competition (12 in number));
- 8) List of publications, reports of scientific conferences, projects and scientific supervisor of students 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) Reference for noticed citations with full bibliographic description of the cited and citing publications;

- 11) Information on original scientific contributions;
- 12) Reference for the implementation of the indicators referred to in Article 122, paragraph 2 of RCPASDOAPSU;
- 13) Copies of the scientific publications submitted for participation in the competition;
- 14) Abstracts' of the publications in Bulgarian and English;
- 15) A copy of the competition notice in the State Gazette.

In conclusion, the documents of Ch. 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. Brief biographical information

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

3. General description of the presented materials of the applicant

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

A list of 7 citations of 6 publications of the applicant is presented. These citations participate in the scoring in the implementation of indicator "D" according to the requirements of Regulation for the Application of (DASRBA) for the acquisition of the academic position "Associate Professor". All citations are visible in SCOPUS. The candidate has been a supervisor of the Master thesis of one graduated student and the leader of the Bulgarian team in 5 projects, two of which are with JINR in Dubna, Russia. He has been a member of the team in 10 other projects in the last 15 years.

Table 1 shows that the applicant covers the scientometric indicators for the academic position of "Associate Professor" in professional management 4.6 "Informatics and Computer Science", according to the requirements of the Regulation for the Application of (DASRBA).

TABLE 1: Credits covered by applicant and 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 Assist. prof. 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 publication 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 Ch. 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 significant in volume and specialized in the field of programming. 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 characteristics of the Scientific and applied-scientific contribution of the applicant

The scientific and scientific-applied activity of the applicant and the topics of the presented works are in the field of the competition. The main results receiving in the presented publications are written clearly and systematically. Brief summaries in English of each of the 12 publications are attached and the relevant contribution of the applicant is highlighted.

The main scientific contributions can be grouped as follows:

- **Group 1: Development of parallel algorithms using MPI and OpenMP libraries applying** interpolation methods and differential schemes for solving problems described by the Lorenz system, a system of 2D perturbed Sine-Gordon equations, and Hamiltonian systems [1, 2, 3, 4, 5, 6]. In this group, the parallel efficiency of algorithms using MPI and OpenMP libraries on HPC computer systems with coprocessors was studied.

- **Group 2: Investigation of numerical simulations of static and dynamic regimes in Josephson junctions** [7, 8, 9, 10, 11, and 12]. In this group, algorithms have been developed applying difference schemes with finite differences and applying finite element method for: (1) studying the dynamics of multistacked Josephson junctions using the unified model of Machida and Sakai; (2) studying of the phase dynamics of stacks from long Josephson junctions using the Sakai-Bodin-Pedersen model;

The described algorithms are realized in a program code and numerical results are obtained: (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 from long Josephson junctions. The critical currents for the individual junctions were obtained for different values of the attenuation parameter in low magnetic field.

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

Evidence of the importance of the candidate's research results is their reflection in the works of other authors. Data on 7 citations of 6 publications of the candidate are presented. All citations are in articles by other authors published in journals and series that are referenced and indexed in Scopus.

7. Evaluation of the applicant's personal contribution

The candidate is a co-author of all scientific publications submitted for participation in the competition, and in 10 of them he is the first author. In this field it is natural to work in teams. The personal contribution of the candidate is beyond doubt.

8. Critical remarks

I don't have any substantial remarks about the materials presented by the assistant professor Ivan Hristov.

9. Personal impressions

I know Ivan Hristov for several years, when he received access as a user to the HPC heterogeneous cluster at ICT-BAS, which has the ability to speed up calculations by using GPU cards and coprocessors. I have excellent impressions of his competence in the scientific field in which he works and his ability to program the developed algorithms for their parallel implementation using accelerators (coprocessors) and graphics cards in order to achieve scientific results.

CANCLUSION

The documents and materials, presented by assistant professor Ivan Hristov, meet all requirements of the Development of Academic Staff in the Republic of Bulgaria Act (DASRBA), the Regulation for the Application 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, results achieved by assistant professor Ivan Hristov in the research activity satisfies the minimum national requirements in the professional field and no plagiarism has been established in the scientific papers submitted at the competition.

After getting acquainted with the materials for the competition and the applicant's qualities, **I give my positive assessment and recommend** to the Scientific Jury to propose to the Faculty Council of the Faculty of Mathematics and Informatics of Sofia University "St. Kliment Ohridski" to elect **assistant professor Dr. Ivan Georgiev Hristov to take the academic position of "Associate Professor" in the professional field 4.6 "Informatics and Computer Science (Programming)".**

18.06.2022

Sofia

Signature:

/Prof. Dr. Todor Gurov/