

STATEMENT REPORT

**on the competition for the academic position of “Associate Professor”
in the scientific field: 4. Natural Sciences, Mathematics and Informatics,
professional field: 4.6. Informatics and Computer Science,
scientific specialty: Informatics (Human-Computer Interaction),
for the needs of Institute of Mathematics and Informatics (IMI)
at Bulgarian Academy of Sciences (BAS),
Competition announced in State Gazette (SG) no. 52 (02/07/2019)**

This statement report has been prepared by Prof. Dr. Boyan Paskalev Bontchev, Department of Software Technologies, Faculty of Mathematics and Informatics (FMI) at Sofia University “St. Kliment Ohridski” (SU), as a member of the scientific jury for the competition according to Order No. 322 / 02.09.2019 of the Director of the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences.

For participation in the announced competition, documents were submitted by **only one** candidate, namely Assistant Professor Todorka Gerasimova Alexandrova, PhD, Department of Mathematical Foundations of Informatics, Institute of Mathematics and Informatics (IMI), Bulgarian Academy of Sciences (BAS).

I. General description of the procedure and submitted documents

1. Details of the procedure and documents

The documents submitted by the candidate in accordance with the competition comply with the requirements of the Act for the Development of the Academic Personnel of Republic of Bulgaria (ADAPRB), the Rules for Implementation of the ADAP of the Republic of Bulgaria (RIADAPRB) and the Rules on the Terms and Requirements for Acquisition of Academic Degrees and Occupation of Academic Positions of IMI-BAS.

In order to participate in the competition, the candidate Assistant Professor Todorka Gerasimova Alexandrova submitted a list of documents, including an application for admission to the competition, a professional curriculum vitae in the European format, a diploma for higher education and an annex to it from the Faculty of Mathematics and Informatics at SU (with specialty Mathematics), diploma for educational and scientific degree “Doctor” from the University of Telecommunication of Tokyo, Japan, and diploma for recognition of this degree the Scientific Council of IMI, BAS, in accordance with the statutory procedure, list of all publications, list of publications submitted for participation in the competition; self-signed reference for the original scientific contributions in the papers for participation in the competition, abstracts of publications for participation in the competition in Bulgarian and English, copies of scientific papers for participation in the competition, list of all citations, list of citations of works for participation in the competition, a copy of SG with the announcement of the competition, a certificate of years of service in the specialty in accordance with the requirements of Art. 24, Para 1, Item 2 of ADAPRB, certificate for satisfying the conditions of Art. 24, Para 1, Item 2 (b) of ADAPRB; a certificate from Waseda University (Tokyo, Japan) for the academic positions of Assistant and Associate Professor, as well as a certificate from IMI-BAS for the post of Assistant Professor; a reference for lectures given and a list of successfully defended masters and doctoral students under her scientific supervision; a reference form for the fulfillment of the minimum requirements of a candidate in a competition for an academic position "Associate Professor" at IMI-BAS; a model declaration for non-use of the works submitted under the competition for the acquisition of the educational and scientific degree “Doctor”.

To participate in the competition, 22 scientific publications were submitted, which included: 3 articles are in scientific journals with Impact Factor (IF), 5 are published in scientific journals with Impact Rank (SJR), 12 are referenced and indexed in Scopus, and 2 are refereed and indexed in the ACM Digital Library. All the works were published after obtaining a doctorate degree and, therefore, none of them could be offered for participation in the previous procedure. For the scientific publications participating in the competition, the applicant submitted a list of

20 citations (excluding auto-citations and hidden citations), all of which are indexed in Scopus. In addition, the applicant submitted a list of all 51 publications. For these publications, the candidate provided a list of 161 citations (excluding auto-citations and hidden citations), all of which are indexed in Scopus.

The set of the documents submitted by the candidate show that Assist. Prof. Todorka Alexandrova meets the requirements of Art. 24 of the ADAPRB, and Art. 53 of the RIADAPRB for the occupation of the academic position "Associate Professor".

2. Short presentation of the applicant

Todorka Alexandrova graduated with a Master's Degree in Mathematics (Algebra) and a second Master's Degree in Teaching Mathematics and Informatics from the Faculty of Mathematics and Informatics at Sofia University "St. Kliment Ohridski" in 2003. She started then a research fellow and PhD candidate at the University of Tokyo, Japan, where in 2008 she received a PhD in Information Security. Next, she has followed teaching and research work at the University of Telecommunications (2008-2009), at Tokyo Metropolitan University as Assistant Professor (2009-2010), and at Waseda University (Tokyo) as Assistant (2010-2013) and as Associate Professor (2013-2018). At the same time, for the period 2002-2015 she worked as a mathematician at IMI-BAS, where she conducted research in the field of coding theory and data security. From November 2018 until now, she is Assistant Professor at IMI-BAS, where she conducts research in the field of data security and cryptography. She is fluent in English and Japanese. Due to her work abroad and at home, as well as thanks to her proven positive personality traits, Dr. Alexandrova possesses excellent teaching skills and extensive international professional experience, including teamwork. For her teaching work, she was honored with a teaching award at Waseda University in 2016, and in 2018 has been included in the national list of the "Top 10 Most Outstanding Young People of Bulgaria 2018" and is the winner of the award in the category "Academic Leadership and/or Achievement". Three of her 51 scholarly articles have been awarded for best article at prestigious international conferences.

3. General characteristics of the applicant's scientific work and achievements

The candidate submits 22 original research papers to the competition, selected from a list of 51 scientific publications. The 22 publications submitted here do not repeat those submitted to the competition for her doctoral degree. From them, as well as from the complete list of publications, it can be concluded that the applicant works mainly in the field of network security, human-computer interactions, social networks and computer games. Most of the work presented is in the field of application and exploration of virtual and augmented reality in intelligent software systems that represent innovative augmented reality games, mobile crowdsourcing platforms and virtual spaces for gamified processes. Another piece of work is expanding the context of intelligent crowdsourcing platforms by basing them on social media and conducting interesting controlled experiments with them. Among the scientific papers presented are those that continue the work of her PhD dissertation in the field of information security, describing applications of threshold schemes for the distribution of secret content on anonymous Peer-to-Peer (P2P) networks.

From the verification of the report on the fulfillment of the minimum national requirements under Art. 2b from ADAPRB for scientific field: 4. Natural Sciences, Mathematics and Informatics, professional field: 4.6. Informatics and Computer Science, it becomes clear that the points for group of indicators A are 50 (at least 50), for group B - 110 (at minimum 100), for group D - 268 (at a minimum of 220), for group D - 120 (at a minimum of 70) and for group E - 30 (at a minimum of 20). The total score for all indicators is **578**, with a minimum total score of **460**, which exceeds the minimum score by **25.65%**. Hence, the reviewer concludes in a motivated and determined way that:

1. scientific works meet the minimum national requirements (according to Art. 2b, para 2 and 3 of ADAPRB) and respectively the additional requirements of the Regulations on the conditions and procedure for acquiring scientific degrees and occupying academic positions in the Bulgarian Academy of Sciences, in particular for the occupation of the academic position of Associate Professor in the scientific field and the professional direction of the competition;
2. the scientific papers submitted by the applicant do not repeat those of previous procedures for acquiring a scientific title and academic position;

3. there is no proven plagiarism in the scientific papers presented at the competition.

4. Description and evaluation of the candidate's teaching experience

Dr. Todorka Alexandrova presented a number of testimonials of her intensive teaching work at three leading Japanese Universities, which leave no doubt in her teaching experience. As a researcher at the University of Telecommunications for the period 2008-2009, she conducts Information Security seminars. As an Assistant Professor at Tokyo Metropolitan University (2009-2010), she leads seminars and exercises in Applied Digital Communication and Circuit Theory. As Assistant Professor at Waseda University (Tokyo) for the period 2010-2013, she lectures on Introduction to Computer Science, Linear Algebra, Mathematical Foundations of Computer Science, and Research Projects. As an Assistant Professor at the same university (2013-2018) she teaches Introduction to Computer Science, Information Security, Linear Algebra, Discrete Mathematics, Introduction to Probability and Statistics, Introduction to Automata, Codes and Ciphers, as well as Mathematical Foundations of Computer Science. At the same time, for the period from 2010 until 2015, Dr. Alexandrova was scientific supervisor of three master's students and two doctoral students, all of whom successfully defended their master's resp. doctoral theses. All the facts presented so far gives a very high rating to the candidate's educational and pedagogical activity.

5. Detailed analysis of the scientific and applied achievements of the candidate contained in the materials submitted for participation in the competition

For participation in the competition, Dr. Todorka Alexandrova presented 22 original scientific works from a list with a total of 51 scientific publications. The submitted 22 publications are in specialized scientific publications in the field of the competition and do not repeat the competition submitted for the candidate for the PhD degree - they were published after 2009. They prove convincingly significant and significant scientific and applied scientific contributions of the applicant in three topics:

1. Application of virtual and augmented reality in development of intelligent software systems – articles 1, 2, 3, 4, 7, 8, 9, 11, 12, 13, 14, 15 and 17 of the competition submission list works;
2. Creating and experimenting with smart crowdsourcing software platforms based on social media – articles 5, 6, 16, 18, 19 and 20 of the list;
3. Applications of threshold schemes for distributing classified content to anonymous Peer-to-Peer (P2P) networks - articles 10, 21 and 22 in the list.

The submitted articles for the competition are published as follows: in scientific journals with Impact Factor (IF) - three articles; in Impact Rank Scientific Magazines (SJR) - five articles; in conference materials, referenced and indexed in Scopus - twelve articles; in conference proceedings, abstracted and indexed in ACM Digital Library - two articles. The total IF of the works submitted for the competition amounts to 3.457 and their Impact Rank (SJR) is 1.063. In two of the publications on the list, the candidate is the first co-author; in 8 - the second co-author; in 7 - the third co-author; and in the other 5 - the fourth co-author. All submitted publications are in English.

There is evidence of a candidate's results in the works of other authors. The total number of citations cited in Scopus of the 22 papers submitted to the competition is 20, excluding the auto-citations and hidden citations. At the same time, the number of citations cited in Scopus during the reviewer's check was found to be 168, and the number of all citations was many times higher. This explains the relatively high h-index and i10-indexes of the candidate in Google Scholar: 12 and 13 respectively.

In addition, the applicant submitted a list of all 51 publications. 27 of them are referenced in Scopus. For these publications, the applicant has submitted a list of 161 citations (excluding auto-citations and hidden citations), all of which are indexed in Scopus.

6. Critical notes and recommendations

I have no significant critical comments on the works presented at the competition. All publications are at an excellent methodological level and contain many in-depth analyzes of the current state of the art in the relevant scientific field, statement of the problem, accuracy and completeness of the proposed solutions and analysis of the

results obtained, and adequate summaries and directions for future work. In all publications presented, the applicant shows a high level of professionalism and excellent literary knowledge.

However, I would like to note a discrepancy between the number of quotations quoted in Scopus from the entries submitted in the competition - 161, and the one at the reviewer's check which was found to be 168. The difference is obviously in favor of the candidate.

As a recommendation to the candidate, I would like to put the idea of publishing more independent articles and having them in well-indexed scientific journals.

7. Personal impression of the applicant

I have excellent personal impressions of Todorka Alexandrova in the competition since she was a student at the Faculty of Mathematics and Informatics at Sofia University "St. Kliment Ohridski ". Even then, she was distinguished for her thoroughness and inclination to solve scientific and applied problems on the one hand, and exhaustiveness and hard work on the other. After her departure for Japan in 2004, I have followed with interest her scientific development at the University of Telecommunications, at Tokyo Metropolitan University as an Assistant Professor, and at Waseda University. Her awards for best conference papers, Teaching and Academic Leadership/Achievement, as well as her inclusion in the national list of the "Top 10 Most Prominent Young People of Bulgaria for 2018", are eloquent evidence of her creative success and revealed potential opportunities. I am convinced that the IMI-BAS team will benefit not only from them, but also from her excellent human and collegial qualities. I would like to congratulate IMI for the fact that it manages to attract back to Bulgaria talented and capable professionals like Todorka Alexandrova and wish that to all the research centers in the country.

8. Conclusion on the application

Having become acquainted with the documents and scientific papers presented in the competition and on the basis of the analysis of their importance and the scientific and applied contributions contained therein, I do **confirm** that the scientific achievements meet the requirements of the Act for the Development of the Academic Personnel of Republic of Bulgaria, the Rules for its Implementation and the corresponding Rules of the Bulgarian Academy of Sciences, and the the Rules on the Terms and Requirements for Acquisition of Academic Degrees and Occupation of Academic Positions of IMI-BAS, for occupation by the candidate of the academic position "Associate Professor" in the scientific field and professional field of the competition. In particular, the applicant meets the minimal national requirements in the professional field and no plagiarism has been detected in the scientific papers submitted for the competition.

I give definitively my **positive evaluation** to the application.

II. GENERAL CONCLUSION

On the basis of the above said, I am convinced to **strongly recommend** to the distinguished scientific jury of the competition to propose to the Scientific Council of the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences to select Assistant Professor Todorka Gerasimova Alexandrova, PhD, for the academic position "Associate Professor" in professional field 4.6 Informatics and Computer Sciences, scientific specialty Informatics (Human-Computer Interaction).

28.10.2019
Sofia

Signature:
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