

# OPINION

by Professor Asya Georgieva Stoyanova-Doycheva, PhD,  
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of the materials submitted to the competition  
for the academic position “**Professor**”  
of the **University of Plovdiv “Paisii Hilendarski”**

Field of higher education: 4. Natural sciences, Mathematics, and Informatics,

Professional field: 4.6 Informatics and Computer Science (Context Modelling)

In the competition for “professor” announced in the State Gazette № 92 of 18.11.2022 and on the website of Plovdiv University “Paisii Hilendarski”, for the needs of the Department of Computer Technologies of the Faculty of Mathematics and Informatics, Associate Professor Todorka Atanasova Glushkova, PhD, from the Department of Computer Technologies, Faculty of Mathematics and Informatics at the University of Plovdiv “Paisii Hilendarski”, participates as a candidate.

## **1. Presentation of the received materials**

By Order № RD-21-341 of 15.02.2023 of the Rector of the University of Plovdiv “Paisii Hilendarski”, I have been appointed as a member of the scientific jury of the competition for the academic position “Professor” at the University of Plovdiv, in field of higher education 4. Natural Sciences, Mathematics, and Informatics, professional field 4.6. Informatics and Computer Science (Context Modelling), announced for the needs of the Department of Computer Technologies at the Faculty of Mathematics and Informatics.

For participation in the announced competition, the only candidate who has submitted documents, is Associate Professor Todorka Atanasova Glushkova, PhD, from the Department of Computer Technologies, Faculty of Mathematics and Informatics at the University of Plovdiv.

The set of paper materials submitted by Assoc. Prof. Todorka Atanasova Glushkova is in accordance with the Rules for the Development of the Academic Staff of the University of Plovdiv.

The candidate Assoc. Prof. Todorka Glushkova has submitted a total of 44 scientific works for participation in the competition, which were not used for the acquisition of the educational and scientific degree “Doctor” and the academic position “Associate Professor”. Of all 44 scientific works, 18 are in journals and book chapters, 2 of them with impact factor, 17 publications at conferences, 1 monograph, 2 books and 5 textbooks, and one teaching aid. Documents are presented (in the form of official certificates) for participation in scientific research projects by the Department of Scientific Research, for participation in educational projects and national educational projects, respectively by the “Hristo Smirnenski” Secondary School in Brezovo and the Centre for Educational Initiative in Sofia. A certificate for participation in a national research project is also submitted from the Institute of Information and Communication Technologies of the Bulgarian Academy of Sciences. Additionally, two distribution protocols are attached for the development of the two books with numbers [36] and [37] from the “List of scientific works for participation in the competition”.

Additionally, the following documents are submitted: lists of scientific works (a full list and of the works for participation in the competition); a list of citations; a certificate of compliance with the minimum national requirements and additional requirements of the Faculty of Mathematics and Informatics at the University of Plovdiv according to Article 76 (1) of the Law on the Development of the Academic Staff of the University of Plovdiv; annotations of the materials for participation in the competition in Bulgarian and in English and self-assessment of the contributions; documents to prove the work experience, teaching, and research activities; copies of scientific works.

All documents and certificates required for holding the academic position of “professor” have been submitted, which fully satisfy the requirements of the Act for the Development of the Academic Staff in the Republic of Bulgaria, the Rules for its implementation, and the Law on the Development of the Academic Staff of the University of Plovdiv “Paisii Hilendarski”. All the publications are entirely on the subject of the competition. The materials are precisely described and arranged.

### **Brief biographical data of the candidate**

Associate Professor Todorka Atanasova Glushkova was born on 19.11.1962. In 1986, she graduated with a Master’s degree from the University of Plovdiv at the Faculty of Mathematics and Informatics with a major in Mathematics, and in 2003 she obtained a Master’s degree in Informatics, again from the Faculty of Mathematics and Informatics. In June 2011,

she acquired the educational and scientific degree Doctor in field of higher education 4. Natural Sciences, Mathematics, and Informatics, professional field 4.6. Informatics and Computer Science, after successfully defending a dissertation on the topic of “Adaptive e-Learning Environment in Secondary Schools”.

The applicant started her work experience as a mathematics teacher in 1986 at the „Cyril and Methodius” Primary School in the village of Borets, Plovdiv region. From 1987 to 1991 she was head of the „Computer” Club at the Brezovo Municipal Council. She has been a teacher and head of the ICT Department at the “Hristo Smirnenski” Secondary School in Brezovo town since 1991. In 2013, Todorka Glushkova was appointed to the position of “Senior Assistant Professor” at Plovdiv University, and since 2018 until now she has held the academic position of “Associate Professor” in professional field 4.6. Computer Science and Informatics (Artificial Intelligence).

## **2. General description of the scientific and the scientific-applied activity of the candidate and evaluation of her personal contribution**

The scientific and scientific-applied activity of Assoc. Prof. Todorka Atanasova Glushkova is mainly focused on approaches for modelling in cyber-physical space, the development of virtual physical space architecture and its application for different fields, and modelling in educational cyber-physical space. These research interests of the candidate are also strongly influenced by tasks addressed internationally and have been realized through her participation in a total of 10 international, national, and university research or education projects, of which 5 are international.

In the submitted materials, Assoc. Prof. Todorka Atanasova Glushkova has included a monograph on “Modelling in cyber-physical systems” [38]. The monograph presents the main contributions of the author related mainly to the creation of a conceptual model of the AmbiNet module of the Analytic Subspace of ViPS and the modelling of spatial aspects of virtualized objects by the formal semantics of CCA and related modelling of processes in the cyberphysical space and the states of the individual objects in it. The monograph is 164 pages in length and satisfies the requirements of the Group B indicators of the minimum national requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria with 100 points.

The publications presented aside from the habilitation thesis include 10 scientific publications in journals and book chapters ([1], [2], [3], [7], [8], [11], [12], [13], [14], [16]) and

13 publications in conference proceedings ([4], [19], [22], [26]-[29], [31]-[35]). Of the publications included in indicator group D, articles [1] and [7] have an impact factor and quartiles Q1 and Q4, respectively, and 7 of the articles have SJR. After checking the Scopus database, I established that article [16] also has  $SJR_{2020} = 0.177$ , which gives me a reason to award it with 30 points. I also found that article [28] has been included in the minimum national requirements reference twice in the Group D indicators, which gives me a reason to reduce the total number of points for this indicator by 18. On the other hand, article [10] from the list of research papers for the competition is not included in the reference of minimum national requirements, which is refereed in the Web of Science and Scopus and has  $SJR_{2021} = 0.142$ . Thus, in Indicator Group D, Associate Professor Todorka Glushkova has 606 points with a minimum requirement of 200 points.

Associate Professor Todorka Glushkova participates in the competition with 45 citations of 24 of her publications in articles of other authors, published in journals refereed and indexed in the Web of Science or Scopus. The candidate has scored 360 points in Indicator Group E and 246.7 points in Indicator Group F, with a minimum requirement of 100 points.

The total number of points achieved by Assoc. Prof. Todorka Glushkova, PhD, is 1362,7 points, with a requirement of 550 points, i.e., she exceeds by 2.5 times the minimum national requirements for holding the academic position “Professor” in professional field 4.6. Informatics and Computer Science.

The submitted scientific works, evidence of academic work, and materials for participation in the competition meet the additional requirements for acquiring the academic position of “Professor” of the Faculty of Mathematics and Informatics of the University of Plovdiv.

The scientific works submitted for the competition contain original scientific and scientific-applied results. The main contributions of Todorka Glushkova are related to the design and development of a component for modelling in the cyber-physical environment – prototype implementations of some of the modules in this component are presented related to ambient-oriented modelling of spatial aspects of “things” such as the visual editor for CCA modelling and the modules for analysis and generation of routes and plans. The second direction of the author’s contributions is in the development of a reference architecture for ViPS and its adaptation for different applications. The candidate has been involved in developments for the application of this architecture in the fields of agriculture, cultural

heritage, and smart cities and her results have focused on scenario modelling using CCA and Tempura in these different application areas. The third area of contributions in Todorka Glushkova's research work is modelling in an educational cyber-physical space, where different scenarios are presented – for the use of this space by disabled people, for integrated learning in STEAM centres, and for lifelong learning of self-study students.

All this gives me a reason to evaluate Assoc. Prof. Todorka Glushkova as a successful and competent researcher and an established scientist with recognized scientific contributions in the field of informatics and context modelling.

#### **4. Characteristics and evaluation of the candidate's teaching activity**

From the presented materials it is evident that Assoc. Prof. Todorka Glushkova, PhD, has a serious and diverse teaching and learning activity. She has conducted training in the compulsory disciplines “Web Design” and “Discrete Mathematics”; “Block Programming” elective courses for bachelor-degree students of all Computer science majors at the Faculty of Mathematics and Informatics of the University of Plovdiv; and “Web Design” for specialities ITMOM and IIIT, 2nd year at the branch in the town of Smolyan. The candidate also teaches in the following Master's programmes: Teaching Informatics and IT, Teaching IT in Junior High School, and Teaching IT in Primary School. The candidate also teaches in the master's programmes Education in Informatics and IT, Education in IT in Junior High School, and Education in IT in Primary School. She is the co-author of 5 textbooks and a teaching aid. The textbooks submitted for the competition ([39], [40], [41]) were approved by the Ministry of Education and Science for teaching block programming and IT to students in grades 4, 5, and 6. Textbooks [42], [43] are for training in Artificial Intelligence in STEM Centers and in this area, Associate Professor Todorka Glushkova participates in an international project “Guidelines for facilitating the learning of Artificial Intelligence (AI) by School Students of Grades 7-12- FACILITATE - AI” as a coordinator for the University of Plovdiv. She is also a co-author of a manual on Artificial Intelligence [44], developed for the needs of Artificial Intelligence training at the Faculty of Mathematics and Informatics of the University of Plovdiv.

It is evident from the submitted materials that Associate Professor Todorka Glushkova has participated in a number of extra-curricular activities – working with graduate and PhD students, committees for state examinations, etc. She has supervised more than 20 successfully

defended diploma students and 4 PhD students (1 has defended his dissertation and 3 ongoing ones).

Assoc. Prof. Todorka Atanasova Glushkova successfully combines her scientific and practical experience with her teaching activity by also working at a secondary school as a teacher. This gives me a reason to highly appreciate the candidate's teaching experience.

### **3. Personal impressions**

I have known Todorka Glushkova for more than 20 years. She is a very respected teacher, a responsible colleague, and an accomplished scientist.

### **CONCLUSION**

The candidate for the announced competition Assoc. Prof. Todorka Atanasova Glushkova, PhD, fully complies with the requirements of the Act for the Development of the Academic Staff in the Republic of Bulgaria, the Rules for the Implementation of the Act for the Development of the Academic Staff, the Law on the Development of the Academic Staff, and the additional faculty requirements of the Faculty of Mathematics and Informatics of the University of Plovdiv "Paisii Hilendarski" for the academic position "Professor".

The above-mentioned is the reason to give a positive conclusion for the election of Assoc. Prof. Todorka Atanasova Glushkova, PhD, as a Professor of "Context Modelling", professional field 4. Computer Science, Mathematics and Informatics.

I propose to the honourable scientific jury to propose unanimously to the respected Faculty Council of the Faculty of Mathematics and Informatics at the University of Plovdiv "Paisii Hilendarski" to elect Assoc. Prof. Todorka Atanasova Glushkova for the academic position of "Professor".

01.03.2023

**Reviewer:** .....

Prof. Asya Stoyanova-Doycheva, PhD