

## SHORT REVIEW

by Prof. Stanimir Nedyalkov Stoyanov, PhD,  
professional direction 4.6 Informatics and Computer Science (Artificial Intelligence)

about the materials submitted for participation in the competition  
for the academic position of 'Professor'  
at the New Bulgarian University,  
higher education field 4. Natural sciences, Mathematics and Informatics,  
professional direction 4.6 Informatics and Computer Science

In the 'Professor' application announced in the State Gazette, No. 65/12.08.2022 for the needs of the New Bulgarian University, as a candidate Associate Professor Velina Todorova Slavova, PhD participated.

By order No. 3-RK-20 dated 05.10.2022 of the Rector of the New Bulgarian University, I have been appointed as a member of the scientific jury of the application for the academic position of 'Professor' at the NBU in the field of higher education 4. Natural sciences, mathematics and informatics, professional direction 4.6 Informatics and computer sciences.

### **Evaluation of compliance with the minimum national requirements and the requirements of the New Bulgarian University**

In my opinion, based on the materials received, the minimum national requirements and those of the New Bulgarian University are satisfied by all criteria. I would like to emphasize that the point assessment of the applicant's overall activity in most criteria exceeds the minimum required.

**Research activity and results.** Taking into account the author's reference and the publications submitted for participation in the application, as well as the usually acceptable volume of the review, I would make the below presented summaries of the contributions of Assoc. Prof. Velina Slavova, PhD. The monograph submitted for participation in the application consisting of four parts is from the field of computational linguistics. In particular, the process of forming concepts and speech is analyzed, as well as language as a means of information exchange. An approach was used for modeling and statistical verification of the formulated hypotheses. The research presented in the monograph uses different formal methods, which makes the obtained results extremely valuable for use in artificial intelligence systems. For example, in the first part, a model of understanding a language message is presented, formally represented by a generalized network (as far as I am familiar with the topic, this is one of the first generalized-network models in linguistics) for processing parallel information flows, and the analysis of network flows shows that the construction of a sentence image takes place in the presence of semantic fusion of concepts; Fibonacci trees and the Monte Carlo method are also used. The theoretical results have been confirmed in a number of ex-

periments. By its nature, the monograph is interdisciplinary, connecting concepts in linguistics, cognitive science, mathematics and informatics (including artificial intelligence).

Apart from the monograph, Assoc. Prof. Velina Slavova, PhD has submitted eight publications for participation in the application; four are referenced in WoS, three are referenced in Scopus and one is referenced in the IEEE database. The first thing, I want to point out is that six of the publications are standalone. I also want to note that, I'm impressed by the strict logical sequence of the candidate's scientific interests and the conduct of scientific research. The research, the results of which are summarized in the publications submitted for participation in the competition, are in the subject matter (and its supplement) of the monograph. The predominant number of publications presents the results of analyzes of various aspects of texts (including comparative analyzes of different languages) using formal methods. The use of formal models and tools ensure the necessary rigor, thoroughness and consistency of the conducted research.

Assoc. Prof. Velina Slavova, PhD presented a list of eleven citations. I did not find the self-cited one. Although few in number, I would like to note the fact that all the citations are in authoritative specialized issues.

According to the submitted documents, Assoc. Prof. Velina Slavova, PhD participated in four international projects. She was the head of two of them.

Summarizing, I want to emphasize that the publications present considerable originality, innovation and number of results, with a significant scientific and practical contribution. I believe that all presented scientific works are from the field of the competition. The publications in renowned publications and in conference materials acquaint interested researchers with the results obtained by Assoc. Prof. Velina Slavova, PhD in the professional field of "Informatics and Computer Sciences".

**Learning and teaching activity.** In 1994, Assoc. Prof. Velina Slavova, PhD started working at the New Bulgarian University, where in 1996 she was appointed to a permanent position as a senior assistant, and since 2003 – Assoc. Prof. In the period from 1996 to 2003, she was successively the program director and head of the Informatics department of the NBU, where the applicant has been working until now. The disciplines she leads at NBU are in the areas of algorithms and data structures, databases, numerical methods, algorithm analysis, natural language processing. She teaches as a part-time lecturer in information technology and statistics at the Francophone Institute of Organization and Management in Sofia. The applicant has repeatedly been a guest lecturer in one-month database design courses at the University of Nantes, France and the French University in Egypt.

**Personal impressions.** I do not know and have no personal impressions of the candidate's research and practical activities.

## **CONCLUSION**

The documents and materials presented by Assoc. Prof. Velina Slavova, PhD meet all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for the Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria, and the relevant Regulations of the New Bulgarian University.

The applicant has presented significant scientific works published after the materials used in the defense of the PhD thesis and the 'Associative Professor' application. The applicant's works contain original scientific and applied contributions that have received international recognition, a representative part of which has been summarized and published in journals and scientific collections issued by international academic publishing houses. The theoretical developments of the candidate have practical applicability, and some of them are directly oriented to the academic work. The scientific and teaching qualifications of Assoc. Prof. Velina Slavova, PhD, are unquestionable.

After getting acquainted with the materials and scientific works presented in the application, analyzing their significance and the scientific, scientific-applied and applied contributions contained in them, I find it reasonable to give my positive assessment and recommend the Scientific Jury to prepare a report-proposal to the Academic Council of the New Bulgarian University for the election of Assoc. Prof. Velina Slavova, PhD, to the academic position of 'Professor' in the New Bulgarian University in professional direction 4.6 Informatics and Computer Sciences.

21.11.2022

Reviewer:

(Prof. Stanimir Stoyanov)