

## **REVIEW**

**from Prof. Georgi Tuparov, PhD**

(Professor in the professional field: 4.6 Informatics and Computer Science)

of the materials submitted for participation in the competition for the academic position "Associate Professor" in the field of higher education: 4. Natural Sciences, Mathematics and Informatics, professional field: 4.6 Informatics and Computer Science, for the needs of the Bachelor's Faculty (Department of Informatics) of the New Bulgarian University (NBU), published in the State Gazette no. 95 of 16.11.2021

The only applicant who has applied for the position is

**Head Assistant Professor Rossitza Ivanova Goleva, PhD,**

from the Informatics Department of the NBU.

This review was prepared in my capacity as a member of the scientific jury for the competition in the professional field 4.6 Informatics and Computer Science according to Order № 3-PK-94 / 06.01.2022 of the Rector of New Bulgarian University.

### **I. Assessment of compliance with the minimum national requirements and the requirements of the New Bulgarian University**

#### **I.1. Applicant details**

The only applicant Rossitza Ivanova Goleva graduated in Computer Science from the Technical University (TU) - Sofia (former Higher Institute of Mechanical and Electrical Engineering) in 1982. Again at TU-Sofia in 2016 she received her PhD degree in the field of higher education 5. Technical sciences, professional field 5.3. Communication and computer equipment. The acquired PhD degree is registered in NACID with covered by scientometric indicators in the respective field.

Now Dr. Goleva holds the academic position of "Head Assistant Professor" in professional field 4.6 Informatics and Computer Science in the Department of Informatics of NBU.

The documents submitted by the competition by the applicant comply with the requirements of the Law on the Development of Academic Staff in Bulgaria and the Ordinance on the development of the academic staff of NBU.

## **I.2. Scientometric indicators of the applicant according to the Law on the Development of Academic Staff in Bulgaria**

From the submitted documents and from my inspection in Scopus, Web of Science, ACM Digital Library and IEEE xPlore Digital Library it is evident that Dr. Goleva has a rich publishing activity. In accordance with the requirements of ZRASRB and PPZRASRB, she has submitted for participation in the competition 16 scientific publications after the acquisition of PhD degree, namely:

- 4 articles in journals, two of which were published in journals with IF [Г7.3 and Г7.4] and two in journals with SJR [Г7.1 и Г7.6];
- 5 papers in Springer series indexed in Scopus, two of which were published in Springer Lecture Notes in Computer Science (with SJR) [Г8.1 and Г8.2], one in Springer Lecture Notes of the Institute of Computer Science, Social -Informatics and Telecommunications Engineering (with SJR) [B4.1], one in Elsevier Procedia Computer Science (with SJR) [Г7.5] and one in Springer Advances in Intelligent Systems and Computing [B4.2];
- 5 chapters in the book “Ambient Assisted Living and Enhanced Living Environments: Principles, Technologies and Control” [B4.3 – B4.7] indexed in Scopus separately;
- 2 papers in proceedings of scientific conferences (with SJR) [B4.8 и Г7.2].

In the table below, I have quantified the applicant's scientometric performance using the current state of the Scopus and WoS databases. It is evident that the submitted scientific papers exceed the minimum national requirements (under Art. 2b, para. 2 and 3 of ZRASRB) for acquiring the academic position "Associate Professor" in professional field 4.6 "Informatics and Computer Science".

Groups	A	Б	B	Г	Д
Minimum number of points	50	-	100	200	50
Maximum number of points	50	-	156	300	144

## **II. General characteristics of the scientific, scientific-applied and other activities of the applicant related to the competition**

### **II.1 Scientific, scientific-applied and applied contributions of the applicant**

As I mentioned above, Dr. Rossitza Goleva participates in the competition for associate professor with 16 major publications related to research of systems and platforms for enhanced

living, analysis and synthesis of hierarchical models of these platforms, defining their open nature using standard protocols and interfaces, testing, scaling, defining services, i.e. the operation of the different levels of the platforms, combining the communication and computing planes of the systems and the Quality of Service. A number of experiments have been conducted with the support of international and national projects. Some mathematical models of systems for an enhanced living have been developed. The main scientific and scientific-applied contributions of Dr. Goleva could be summarized in the following groups:

- **The basic requirements for improvement of enhanced living systems are analyzed.**

A general analysis of the requirements for improvement of enhanced living systems is made in publication B4.1. Attention is paid to the scope, services, communication part, access levels and application level of the system. The possibility for duplication through the peer port of data exchange at the application level in a distributed environment with a low degree of reliability is analyzed. Publication B4.6 presents an analysis of the information part of the system and cloud services in a distributed environment.

The integration of systems for an enhanced living with open and closed systems, the peculiarities of working with micro and macro services and applications, the principles of opening systems for integration are presented in publication B4.2. Again, a specific solution for the body local area network is presented.

- **The architecture of a platform for an enhanced living is defined, user groups and scenarios for its application are classified.**

The architecture of the platform for an enhanced living, which is the basis of Dr. Goleva's contributions, is presented in publication B4.4. The architecture of the platform is hierarchical as there are two planes, communication plane and information processing plane, each plane is divided hierarchically into levels. The operation of the so-called cloud computing level, fog computing level and dew computing level is defined, as well as a smart dust computing level is defined. At all levels of the defined platform the possibilities for working with standard protocols and interfaces are shown and the ways of working with public and private data.

From the point of view of the defined architecture, the main functions, digitization processes, generation and analysis of large volumes of data, data processing, data storage and data traffic, data protection, data processing with machine learning algorithms and big data technologies are analyzed (publication B4.3).

Primary, secondary and tertiary users of the platform have been identified and classified, as well as the scenarios for their interaction with the platform. These scenarios and the services derived from them form a monitoring environment in the edge and core parts of the platform known as Ambient Assisted Living as-a-Service (AALaaS) and Enhanced Living Environment as-a-Service (ELEaaS).

- **The principles of designing a platform architecture for an enhanced living have been identified.**

Paper B4.1 presents the separation of access functions from the cloud functions and cloud services, and paper B4.2, develops ways of exchanging data between parts of the platform, the data flows and processing of data in a distributed environment. In B4.4 the applicant presents the separation of the communication and information planes of the platform in order to facilitate the integration of data, access technologies and services, and in B4.7 develops the work at the cloud level, data traffic and upgrading the platform with services and applications, based on these data and their primary and secondary processing.

- **Mathematical models for traffic analysis and a machine learning algorithm for data analysis have been developed.**

An important part of the design of a platform such as the one for an enhanced living environment is to measure the traffic in it and to provide the appropriate facilities for servicing this traffic from the respective nodes. For this purpose in the paper  $\Gamma 7.1$ . a model is presented with a generalized formula of Erlang, known as Erlang - C formula and used for desing the equipment in the platform depending on traffic and its characteristics. With its help the desing of the platform for work with micro services ELEaaS is shown.

The automation of the process for automatic retrieval of properties from data streams with machine learning algorithms is presented in ( $\Gamma 7.3$ ,  $\Gamma 7.4$ ,  $\Gamma 8.1$  and  $\Gamma 8.2$ ). In the paper  $\Gamma 7.6$  models for monitoring the activity of people using a mobile device are presented.

- **Implemented functionalities of the platform for an enhanced living have been tested.**

The testing of the services and the psychological effect of their use are analyzed in publications B4.5 and B4.6. The paper B4.8 presents implementation for people with dementia and platform testing.

Some of the services and applications that have not been tested in a real environment are simulated. A peer port at the application level is simulated in the 5G network that have high

reliability requirements (Г7.2.). The application of machine learning algorithms for recognizing patterns of audio signals in patients with dementia is shown (Г7.3).

## **II.2 Reflection of the applicant's scientific publications in the literature**

Dr. Goleva is well represented in the indexing systems as a number of citations. According to Scopus, Dr. Goleva has a total of 155 citations (excluding self-citations) and H-index 5, and in WoS citations (excluding self-citations) are 156 and H-index 7. Of these, 20 citations in WoS and Scopus are presented for the competition, of which I accept as admissible 18, which as scientometrics significantly exceed the minimum requirements of PPZRASRB.

## **II.3 Evaluation of the results of participation in research and innovation projects and application of the obtained results in practice.**

Dr. Goleva has participated or is currently participating in more than 35 scientific and educational projects with international or national funding. The results achieved in them are published in indexed editions, and some of the publications are presented in this competition.

## **II.4 Assessment of the personal contribution of the applicant**

All scientific papers submitted for review are co-authored and I accept that the applicant's participation in them is equal to other authors, which, however, does not reduce the significance of the results achieved.

## **II.5 Fulfillment of the additional requirements according to the Ordinance for development of the academic staff of NBU**

Dr. Goleva fully meets the additional requirements of groups Ж, 3 and И of the Ordinance on the development of the academic staff of NBU.

## **III. Teaching activities**

Dr. Goleva is a longtime lecturer, initially in the Department of Communication Networks at the Technical University - Sofia, and then since 2017 until now as Assistant Professor in the Department of Informatics at NBU. So far, Dr. Goleva has participated in the development and implementation of numerous disciplines for Bachelor's and Master's degrees in ICT. She is a co-author of 2 textbooks for higher education.

## **IV. Administrative and public activities**

Dr. Goleva is the Director of the Program Council of the Informatics Department of the NBU and participates in conducting interviews of applicants for training in the master's

programs of the Department. I should also note her many years of successful work in the Bulgarian section of the IEEE.

#### **V. Personal impressions of the applicant**

I personally know Dr. Goleva initially as an active member of the Bulgarian section of the IEEE. I have excellent impressions of her as a scientist, lecturer and colleague in the Department of Informatics.

#### **VI. Recommendations and notes on the activities and achievements of the applicant**

I have no remarks or recommendations.

#### **VII. Conclusion**

After getting acquainted with the documents presented in the competition, scientific publications and contributions in them, I confirm that the applicant Head Assistant Professor Dr. Rossitza Ivanova Goleva fully meets the requirements of ZRASRB, PPZRASRB and the Ordinance on the development of the academic staff of NBU to hold the academic position of "Associate Professor" in higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.6 Informatics and computer science. In particular, the applicant fully satisfies the minimum national requirements in the professional field and no plagiarism has been established in the scientific papers submitted at the competition.

I give my positive assessment of the candidacy.

Based on the above, I recommend the scientific jury to propose to the Academic Council of the New Bulgarian University to elect Ch. Assistant Professor Dr. Rossitza Ivanova Goleva to take the academic position of "Associate Professor" in the professional field 4.6 Informatics and Computer Science.

30.03.2022

Reviewer:

(Prof. Georgi Tuparov, PhD)