

R E V I E W R E P O R T

On Scientific Work for Participation in the Competition

for the Academic Position of ‚Professor’

in 5.3 ‘Communication and Computer Engineering’ Professional Orientation,

(‘Computer Networks’ Speciality)

with the Department of Computer Science and Technology

to the Faculty of Computer Sciences and Automation

at the Technical University of Varna,

Announced in State Gazette Issue No. 110 of 24/12/2021

with Candidate Assoc. Prof. Veneta Panayotova Aleksieva, PhD

from Prof. Mihail Petkov Iliev, D.Eng. Sc

1. Background and Biographical Information

Assoc. Prof. Veneta Panayotova Aleksieva, PhD, Associate Professor at the Technical University—Varna, is the only applicant who had submitted documents for participation in the competition for the academic position of ‘Professor’ announced in the State Gazette, Issue No 110 of 24/12/2021 and on the website of the Technical University—Varna (TU-Varna) for the needs of the Department of Computer Science and Technology at the Faculty of Computer Science and Automation.

Veneta Panayotova Aleksieva obtained her Master's degree in Computing from the Technical University of Varna in 1993. In 2000 she acquired a Master's degree in Accounting and Control from the University of Economics - Varna, and in 2010 - a Master's degree in ‘Power Engineering and Electrical Equipment in Industry’ from the Technical University of Varna. In 2012 the applicant earned a doctoral degree in ‘Automated Systems for Information Processing and Management’, and in 2016 she was selected for the academic position of ‘Associate Professor’ in 5.3 ‘Communication and Computer Engineering’ professional orientation at TU-Varna.

2. General Description of the Submitted Materials

The candidate participates in the competition with 60 scientific publications, including:

- **53** scientific publications (articles and papers);

- 7 study guides.

The candidate's publications are categorized as follows:

- 16 publications equivalent to a monograph titled 'Approaches to Improving the Quality of Services (QoS) in Networks Based on Wireless Technologies';
- 13 publications in editions referenced and indexed by internationally acclaimed scientific databases;
- 24 publications in unreferenced journals requiring review of scientific production, incl. 2 single-authored.

3. General Characteristics of the Candidate's Scientific and Applied Research Activity

15 of the publications submitted for review are in Bulgarian and 38 are in English.

With regard to the presentation forum the publications are divided as follows:

- 12 papers in Bulgarian and presented in Bulgaria;
- 32 papers in English and presented in Bulgaria, incl. 30 indexed in SCOPUS and Web of Science databases;
- 1 paper in English presented at a foreign scientific forum;
- 3 articles in Bulgarian and published in Bulgaria;
- 5 articles in English and published in Bulgaria;
- 1 article in English and published abroad.

With regard to the composition of the author's team, the publications are divided as follows:

- 2 single-authored;
- 15 produced in collaboration with one contributing author;
- 30 produced in collaboration with two contributing authors;
- 6 produced in collaboration with three or more than three contributing authors.

The scientific publications submitted for participation in the competition are in the following 5 main thematic fields:

- 22 pieces of research related to the methods and tools for improving the Quality of Services (QoS) in modern wireless networks;
- 10 pieces of research in the field of cloud services;
- 5 pieces of research in the field of modern network security;
- 9 pieces of research related to blockchain technology application in business;
- 7 pieces of research in the field of computer systems and technologies.

Assoc. Prof. Veneta Aleksieva, PhD has participated in 8 national scientific or educational projects in 5 of which she was the project team leader. The candidate was an evaluator of 10 projects of the European Commission. As of the date of writing the present review report the Scopus database lists 35 scientific publications of the author having a Hirsh index of 4. Information has been presented about 34 citation counts or review reports in editions referenced and indexed by internationally acclaimed scientific databases or in monographs and collective volumes and 29 citation counts in monographs and collective volumes with scientific review.

4. Assessment of the Pedagogical Competence and Activity of the Candidate

Assoc. Prof. Veneta Aleksieva, PhD has worked as a lecturer with the Department of Computer Science and Technology at the Technical University of Varna since 2006. She has delivered courses and lectures both in Bulgarian and in English in a variety of subjects to students in the Bachelor's and Master's degree programmes. The applicant has taken part in numerous curricula development activities and has lectured at various European universities under the Erasmus programme. The candidate is actively engaged with students. She supervised two doctoral students in the preparation and defence of their dissertations, more than 50 graduates in Bachelor's and Master's degree programmes and had examined over 40 diploma theses of undergraduate and graduate students. Veneta Aleksieva is a certified instructor at the CISCO Network Academy at the Technical University of Varna. She also has a fifth teacher qualification degree in Computing and Information Technologies. While at TU-Varna the applicant published 12 study guides and 1 book in English. All in all, it can be concluded that the teaching work and pedagogical activities of Assoc. Prof. Dr. Veneta Panayotova are diverse and meaningful.

5. Main Contributions

The main contributions of the candidate's scientific work for participation in the competition are in the following thematic fields:

- 5.1.** Methods and tools for improving the quality of service (QoS) in modern wireless networks
- 5.2.** Cloud services
- 5.3.** Computer network security
- 5.4.** Blockchain technology in business
- 5.5.** Computer systems and technology

Scientific and Applied Research Contributions:

5.1 Field:

- An algorithm is proposed for resource allocation in LiFi network based on prioritization of traffic classes;
- Algorithms and approaches for improving QoS for LTE networks based on traffic prioritization in the Scheduler are proposed;
- An algorithm for building an energy-balanced ZigBee network is proposed;
- An algorithm for allocating resources in a 6LoWPAN network based on traffic prioritization is proposed;
- An algorithm for finding the best route in a LoRaWAN network is proposed;
- Approaches to improve QoS for wireless sensor networks based on LiFi, ZigBee, 6LoWPAN and BLE technologies are proposed.

5.2 Field:

- Algorithms and approaches for balanced load in SDN and finding the best route between hosts are proposed;
- A model and an approach for Active Directory management as a Directory-as-a-Service is proposed;
- An approach is proposed for the implementation of a cloud service for reservations for medical check-ups

5.3 Field:

- An approach to vulnerability testing in wireless networks is proposed.

5.4 Field:

- Insurance models are proposed based on a smart contract on a private blockchain, a public blockchain and a combined solution;
- A property insurance model based on a smart contract on a blockchain is proposed;
- A life insurance model based on a smart contract on a private blockchain is proposed.

5.5 Field:

- A method is proposed for activating a wearable device with a touch-sensitive bezel with 2 fingers;
- A method is proposed for position recognition when activating a wearable device interface;
- An algorithm for improving QoS in PON networks through priority allocation of resources is proposed.

Practical Contributions:

5.1 Field:

- Prototypes for LiFi communication have been developed;
- A prototype for indoor LiFi network has been implemented, which implements horizontal handover;
- A simulation tool for LTE network has been developed, implementing the proposed algorithm and 9 more known ones;
- A simulation tool for LiFi network has been developed, implementing the proposed algorithm and 3 more known ones;
- A simulation tool has been developed for the 6LoWPAN network, implementing the proposed algorithm and 6 more known ones;
- A simulation tool for ZigBee network has been developed, implementing the proposed algorithm;
- A simulation tool for BLE network has been developed for visualization of the communication in it;
- A simulation tool for LoRaWAN has been developed, implementing the proposed algorithm;
- An experimental network for implementation of 6LoWPAN, ZigBee, BLE technologies has been implemented.

5.2 Field:

- An experimental virtual infrastructure for training in computer networks-related subjects has been implemented;
- Web-based and Cloud-based systems for booking medical check-ups have been developed;
- 6 tools for monitoring and managing virtual infrastructures based on Zabbix for VMWare have been developed;
- A web-based Active Directory management tool has been developed.

5.3 Field:

- A generator of DoS attacks has been developed;
- A hardware data collection system for wireless networks has been developed suitable for war-driving technology,.

5.4 Field:

- The proposed models have been implemented through smart contracts on public blockchain - Ethereum and on private blockchain - Hyperledger-Fabric;

- A web-based system for selling crypto-tokens for ICO (Initial Coin Offering) based on Ethereum blockchain has been created.

5.5 Field:

- 2 prototypes of a smartwatch have been created - with buttons and a touch-sensor bezel;
- A test tool has been created to collect readings for activating the touch interface of a wearable device with 2 fingers;
- A simulation tool for PON network has been developed, implementing the proposed algorithm;
- A software training system for coding and modulation has been developed.

6. Significance of Contributions to Science and Practice

Upon a comprehensive assessment I have established that the contributions of Assoc. Prof. Veneta Panayotova Aleksieva PhD are significant and could be classified as follows:

- Enriching knowledge and systems through formulation of innovative approaches in existing scientific fields;
- Developing modified algorithms, methods and designs and obtaining supporting facts.

7. Evaluation of the Authorship of the Applicant's Contributions

The candidate participates in the competition with 60 scientific publications, incl. 53 articles and papers and 7 study guides. Two of the publications are single-authored - Г8.3 and Г8.8. The candidate is the lead author in 23 publications - B4.1, Г7.1, Г7.2, Г7.3, Г7.5, Г7.9, Г7.10, Г8.1, Г8.5, Г8.6, Г8.9, Г8.10, Г8.11, Г8.12, Г8.13, Г8.14, Г8.16, Г8.17, Г8.18, Г8.19, Г8.20, Г8.21, Г8.22. No appendix has been presented for assignment of authorship in the collaborative publications and I have therefore assumed equal authorship for all contributors listed.

I know Assoc. Prof. Veneta Aleksieva, PhD. I submitted an evaluation statement on the materials for her first habilitation. In consideration of the above and having analysed the scientific publications submitted for review, I have no doubt in the authorship of the contributions of Assoc. Prof. Veneta Aleksieva PhD outlined above.

8. Critical Remarks and Recommendations

Based on the analysis of the work submitted for review within the present competition, I would make the following remarks and recommendations to the prospective work of Assoc. Prof. Eng. Veneta Panayotova Aleksieva, PhD:

1. The number of single-authored publications is relatively small;

2. The author is recommended to seek opportunities for writing a monograph on computer networks and technologies;
3. To intensify her work with local and international researchers in order to build a team with the capacity to obtain more meaningful results and to participate in national and international research projects and programmes.

9. Personal Impressions and Statement of the Reviewer on the Remaining Aspects of the Candidate's Activities

I have known the candidate participating in the competition Assoc. Prof. Eng. Veneta Panayotova Aleksieva, PhD for more than 10 years. I know her scientific and teaching work. I was a member of the scientific jury and wrote an evaluation statement for the competition for the academic position of 'Associate Professor' in which she participated. I have worked with her colleagues who have always given positive feedback about her, her teaching and research work. I would therefore reasonably conclude that I have formed an adequate opinion about the candidate and her scientific work.

Conclusion

The scientific work submitted for review within the competition is in line with the requirements outlined in the Law on Academic Staff Development and the regulations of the Technical University—Varna for awarding the academic position of 'Professor'. Assoc. Prof. Eng. Veneta Panayotova Aleksieva, PhD has performed the required teaching and research work, she has achieved results and published scientific papers having the necessary contributions. Overall, the applicant's scientometric results considerably exceed the minimum requirements for awarding the academic position of 'Professor'.

In view of the above, I would propose that Assoc. Prof. Eng. Veneta Panayotova Aleksieva, PhD be selected for the academic position of 'Professor' in 5.3 'Communication and Computer Engineering' professional field, 'Computer Systems, Complexes and Networks' scientific speciality ('Computer Networks' academic subject) with the Department of Computer Science and Technology at the Faculty of Computer Science and Automation at the Technical University - Varna.

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