

## R E V I E W

in a competition for the academic position of “Associate Professor” in professional field 5.3 “Communication and Computer Engineering” subject “Fundamentals of computer communications”,



Announced: in State Gazette issue 2/05.01.2024

Candidate: **Assistant Professor Eng. Aydan Mehmed Haka, PhD**

Reviewer: **Prof. Eng. Teodor Bozhidarov Iliev, PhD**

### **1. General information and biographical data**

In this competition for occupation the academic position “Associate Professor”, appointed in the Bulgarian State Gazette issue 2/05.01.2024 and on the official website of Technical university - Varna, the only candidate for this position is Assistant Professor Eng. Aydan Mehmed Haka, PhD.

Assistant Professor Eng. Aydan Mehmed Haka, PhD is graduated from Technical University - Varna with MSc “Computer Networks and Communications” in 2017. In the same year, after a competition, he was selected as an assistant in the Department of Computer science and Technology at the Technical University - Varna, consecutively as an assistant and chief assistant.

He defended successfully a dissertation for obtaining the educational and scientific degree PhD on the topic “Methods and Means for Enhancing QoS in Wireless Technology Based Networks” (2020) in the scientific field “Computer systems, complexes and networks”.

The candidate has good language skills. He is fluent in English (B2) and Turkish (C1), which allows Assistant Professor Haka to maintain useful contacts and exchange information with colleagues from abroad. He has good communication and teamwork skills acquired during his work as a lecturer and participant in research projects.

In addition to scientific and research work, Assistant Professor Haka has wide public activities: he is a member of professional organizations - John Atanasoff Society of Automatics and Informatics (SAI), FNTS, and reviewer at international scientific conferences. He is a member of organizational and program committees of international scientific conferences.

All the necessary documents for participation in the competition for the academic position “Associate Professor” are presented including application to the Rector of TU-Varna, candidate CV, diploma for the Educational and Scientific Degree “Doctor”, certificate of completion of the minimal national requirements, list of scientific papers related to the competition, description of the contributions, papers submitted for the acquisition of the Educational and Scientific Degree “Doctor”, papers for participation in the competition for “Associate Professor” and other documents for scientific and teaching activities of the candidate. The entire documentation is very thoroughly prepared and contains all the necessary information for the competition about the candidate.

Assistant Professor Aydan Haka's research, engineering, and pedagogical activities are developed in a balanced and simultaneous way, complementing each other.

### **2. General description of the submitted materials**

Assistant Professor Eng. Aydan Mehmed Haka, PhD participated in the competition with 43 scientific papers according to the groups of indicators (B.4, G.7 and G.8) and 1 textbook.

The publications can be classified, as follows:

#### **- By importance**

- Referenced and indexed in a world-renowned database (Scopus) – 25 papers [B4.1 - B4.19, G7.1 - G7.6 of the attached list of publications].

#### **- By language:**

- English - 31 papers [B4.1 - B4.19, G7.1 - G7.6, G8.2, G8.3, G8.4, G8.6, G8.10, G8.14 of the attached list of publications];

- Bulgarian - **12** papers [G8.1, G8.5, G8.7, G8.8, G8.9, G8.11, G8.12, G8.13, G8.15, G8.16, G8.17, G8.18 of the attached list of publications];

**- Place of publication:**

- Articles in Bulgarian journals - **13** papers [G8.1, G8.2, G8.3, G8.5, G8.6, G8.7, G8.10, G8.11, G8.12, G8.14, G8.15, G8.16, G8.18 of the attached list of publications];
- Reports in proceedings of international scientific conferences abroad - **2** papers [B4.18, G7.5 of the attached list of publications];
- Reports in proceedings of international scientific conferences in Bulgaria - **28** papers [B4.1 - B4.17, B4.19, G7.1 - G7.4, G7.6, G8.4, G8.8, G8.9, G8.13, G8.17 of the attached list of publications];

**- By the number of co-authors:**

- With single-author - **8** papers [G8.4, G8.6, G8.7, G8.8, G8.9, G8.10, G8.12, G8.15 of the attached list of publications];
- With one co-author - **12** papers [B4.1, B4.15, G7.4, G8.1, G8.2, G8.3, G8.5, G8.11, G8.13, G8.14, G8.17, G8.18 of the attached list of publications].
- With two co-authors - **11** papers [B4.2, B4.3, B4.4, B4.6, B4.7, B4.8, B4.10, G7.1, G7.2, G7.3, G8. of the attached list of publications].
- With three or more co-authors - **12** papers [B.4.6, B4.9, B4.11, B4.12, B4.13, B4.14, B4.16, B4.17, B4.18, B4.19, G7.6, G7.6 of the attached list of publications].

The contents of the above scientific papers are fully relevant to the scientific field of the competition for the academic position "Associate Professor".

### **3. General characteristics of the research and applied activities of the candidate**

The scientific research and applied activities of the only candidate in the competition are in the field of communication networks and systems.

The candidate Assistant Professor Aydan Haka has presented materials - scientific papers equivalent to monograph, scientific publications, reference for citations, participation in scientific projects, lecture materials on different subjects, with which he completely covers the minimum national requirements for occupying the academic position of "Associate Professor" in the field of Technical Sciences in higher education - according to article 2b of the Rules for Implementation of the Academic Composition Development Law in the Republic of Bulgaria and Regulations for the conditions and order for acquiring academic degrees and academic positions at Technical University - Varna. The candidate's main scientific and applied contributions in the submitted publications under the competition can be classified according to the fulfillment of the scientometric criteria as follows:

<b>Group of indicators</b>	<b>Content</b>	<b>Minimum score points for academic position "Associate Professor"</b>	<b>Fulfillment</b>
<b>A</b>	Indicator 1	50	<b>50 pts.</b>
<b>B</b>	Indicator 3 or 4	100	<b>344 pts.</b> (Indicator 4)
<b>G</b>	Sum of indicators from 5 to 9	200	<b>336,65 pts.</b> Indicator 7 – 79,99 pts. Indicator 8 – 256,66 pts.
<b>D</b>	Sum of indicators from 12 to 14	50	<b>190 pts.</b> Indicator 12 – 190 pts.
<b>J</b>	Indicator 29	30	<b>150 pts.</b> Indicator 29 – 150 pts.

A comparison of the application materials presented in fulfillment of the minimal national and institutional requirements for the academic degree "Associate Professor", shows the following:

**Indicator group A** - dissertation for occupying the "Doctor" degree (at least 50 points) – 50 points;

**Indicator group B** – indicator 4, scientific publications (at least 10) which are referenced and indexed in world famous databases (at least 100 points) - 344 points;

**Indicator group C** – 6 scientific papers which are referenced and indexed in world famous databases – 79,99 points and 18 scientific papers in peer-reviewed and non-refereed editions – 256,66 points. Total for indicator G - 336,65 points.

**Indicator group D** – citations or reviewing in scientific editions, which are referenced and indexed in world famous databases or in monographs and collective volumes (at least 50 points) – 19 citations in scientific editions, which are referenced and indexed in world famous databases of 8 scientific papers - 190 points. Assistant Professor Aydan Haka has H index 4 as a result of his exhaustive research work, publications, and being cited by other authors - <https://www.scopus.com/authid/detail.uri?origin=resultslist&authorId=57196043216>.

**Indicator group J** - lectures at Technical university-Varna for the last three years (at least 30 points) – *Fundamentals of computer communications (correspondence learning)* - BSc, *Computer networks (correspondence learning)* - BSc, *Local and Internet networks administration (correspondence learning)* - BSc, *Computer architectures and networks (correspondence learning and full-time learning)* - BSc – 150 points.

#### **4. Assessment of the pedagogical preparation and activity of the candidate**

Assistant Professor Aydan Haka has considerable teaching experience. Over the last 3 academic years he has taught the following subjects: Fundamentals of computer communications, Computer networks, Local and Internet networks administration, Computer architectures and networks for the Bachelor's and Master's degrees in the professional field 5.3 Communication and Computer Engineering, as well as for incoming Erasmus students.

He has been a diploma work supervisor to more than 20 students who defended successfully. Undoubted proof of Assistant Professor Aydan Haka's work with students not only during regular academic hours but also outside of them is the participation of students with scientific articles under his supervision at different international conferences.

Assistant Professor Aydan Haka has realized Staff Mobility for Training under Erasmus+ Programme in Çanakkale Onsekiz Mart Üniversitesi, Turkey. He is co-author of one textbook - Wireless Communications.

#### **5. Main scientific and scientific-applied contributions**

From the analysis of the presented materials, I can classify the main contributions of the candidate in the competition as follow:

##### **1. Research in the field of methods and means of improving the Quality of Service in wireless sensor technologies for IoT**

The following scientific papers from indicator B.4 and G.8 (B4.1, B4.2, B4.6, G8.5, G8.10, B4.3, G8.8, B4.4, B4.10, B4.8, G8.9, B4.5, B4.12, B4.11, B4.17, G8.11, G8.13, G8.14, B4.7, B4.9, B4.14, B4.15, B4.16, B4.18, G8.16, B4.13, B4.19, G8.7, G8.15, G8.17 of the attached list of publications, 30 papers) can be referred to this area and the following contributions:

##### **1.1 Scientific and scientific-applied contributions:**

- An improved traffic prioritization algorithm is proposed in 6LoWPAN and ZigBee networks for IoT.
- Recommendations are formulated for the cases in which it is more appropriate to use end nodes from the manufacturers Texas Instruments and Sonoff or simulation with ZigBee networks for IoT.
- A system of criteria for complex evaluation of simulators of ZigBee networks and BLE networks is proposed.
- Recommendations are made for when it is more appropriate to use ZigBee, 6LoWPAN or BLE networks for IoT.

- A system for monitoring and storing data from LoRa and ZigBee wireless sensor networks for IoT is proposed, based on which an integrated environment for monitoring and storing data from various wireless sensor networks is proposed.
- Approaches have been proposed to lower the energy consumption of BLE networks for IoT.
- An algorithm for finding an optimal route in a Z-Wave network is proposed.
- An algorithm for forming a hierarchical ZigBee topology for balancing energy consumption is proposed.

#### **1.2. Applied contributions:**

- An improved simulation environment for 6LoWPAN and ZigBee networks has been developed for QoS research.
- An experimental wireless 6LoWPAN and ZigBee sensor network for IoT is implemented for QoS research with Beagle Bone Black coordinator and TI CC2650STK sensor nodes.
- An experimental wireless ZigBee sensor network for IoT is implemented for QoS research with ZigBee2MQTT coordinator implementation software and Sonoff sensor nodes.
- An experimental wireless BLE sensor network for IoT is implemented for QoS research with Raspberry Pi master device and TI CC2650STK sensor nodes.
- An experimental wireless BLE sensor network for IoT is implemented for QoS research with Arduino nano 33 IoT master device and Arduino nano 33 BLE sense sensor nodes.
- A simulation environment has been developed for BLE and LoRa networks to study the quality of service.
- A web system for monitoring data from advanced wireless sensor networks for IoT has been developed.
- An experimental wireless LoRa sensor network for IoT is implemented for QoS research with Dragino LG01-S coordinator and Dragino LoRa Shield nodes.
- A simulation environment for Z-Wave networks has been developed to study the quality of service.

## **2. Research in the field of computer technology and communications**

The following scientific papers from indicator G.7 and G.8 (G7.1, G7.2, G8.2, G8.3, G8.4, G8.6, G8.12, G7.3, G7.4, G8.18, G7.5, G7.6, G8.1 of the attached list of publications. 13 papers) can be referred to this area and the following contributions:

#### **2.1. Scientific and scientific-applied contributions:**

- A system of criteria is proposed for the complex evaluation of distance learning solutions on computer networks and of communication protocols for the automotive industry.
- A logistics model based on smart contract for blockchain and IoT is justified.
- A model for a controlled environment based on blockchain and IoT is developed.
- A resource allocation algorithm in OFDM-PON is proposed.

#### **2.2. Applied contributions:**

- An improved simulation environment for LTE networks and PON networks has been developed to study the Quality of Service.
- An experimental virtual laboratory on computer networks has been implemented.
- Implementation of the proposed models on the Hyperledger Fabric blockchain.

I accept the contributions announced by Assistant Professor Aydan Haka, PhD. I define the contributions presented as: scientific, scientifically applicable, and applied. I consider that the requirements for quantitative performance criteria for academic position "Associate Professor" are met.

Assistant Professor Aydan Haka has submitted information for 19 citations of his papers in SCOPUS and/or Web of Science database (8 are by foreign authors). When checked in the Scopus database, there are a total of 48 citations. All this testifies that the publications of Assistant Professor Aydan Haka, PhD are well known and accordingly appreciated by the scientific community in our country and abroad.

#### **6. Significance of contributions to science and practice**

The scientific and scientific-applied research of Assistant Professor Aydan Mehmed Haka has contributed to the theory, practice and education because they are dedicated to current problems of the evolution of the communication networks - methods and means to improve the Quality of Services and communication networks, based on wireless technologies for IoT.

Assistant Professor Haka's contributions have become available to the scientific community in Bulgaria and abroad, through his publication activity (25 scientific papers in the Scopus database) in prestigious scientific forums (conferences: BIA 2020; ET 2019; ICAI 2019, 2020, 2021, 2022, 2023; CIEES 2020, 2021, 2022, 2023; ELMA 2019, 2021, 2023; SIELA 2020; EEPES 2022, 2023); Scientific conferences Techsys 2017; ICESS 2018; UNITECH, 2020, 2021, 2022, etc. Journals: "Computer science and technology" 2016, 2018, 2020, 2021, 2022, 2023; ELECTROTECHNICA & ELECTRONICA 2019, 2020, The Journal of CIEES 2022, "Journal of the Technical University – Sofia" 2017, etc. Evidence of this is the more than 48 citations in Scopus.

Assistant Professor Haka's authority in the scientific community speaks the fact, that he is a member of the organizing committee of the conference "Computer Sciences and Technologies" and to the organizing committee of the conference "International Conference Automatics and Informatics", and reviewer of the scientific articles for the following international conferences "International Scientific Conference of Communications, Information, Electronic and Energy Systems" 2022, 2023 and "International Conference on Electronics, Engineering Physics and Earth Science" 2022, 2023.

The independent publications of Assistant Professor Aydan Haka, PhD and those where he has a lead role, are evidence of his leadership in the research. The scientific ideas and approaches presented and defended in scientific forums are an assessment of the candidate's personal contribution. The presented quantitative indicators correspond with the criteria for occupying the academic position "Associate Professor".

#### **7. Critical remarks and recommendations**

I have no critical remarks on the documents, scientific production and academic activity presented by the candidate. I will point out some recommendations for the future work of Assistant Professor Aydan Haka:

- To increase its representation to the scientific community through participation in international scientific forums abroad;
- Aim to publish independent or co-authored scientific works in journals indexed in SCOPUS and/or Web of Science, which would also help to increase the citation of publications;
- Gain experience in project activity through participation in international scientific projects.

#### **8. Personal impression and opinion of the reviewer**

I know Assistant Professor Aydan Mehmed Haka, PhD personally from participation in the annual international scientific conference CIEES and international scientific conference EEPES. Assistant Professor Haka has left an impression of a serious and business-oriented scientist. He has the reputation of an erudite lecturer.

## CONCLUSION

My general assessment is that the applicant's presentation in the competition for occupying the academic position "Associate Professor" corresponds with the requirements of the Law for the Development of Academic Staff in the Republic of Bulgaria and the Regulations on its implementation as well as the Regulations for the conditions and order for acquiring academic degrees and academic positions at Technical University - Varna.

After reviewing the candidate's scientific works for participation in the competition, assessment of their significance, the scientific, scientific-applied and applied contributions contained in them, I find it appropriate to **recommend Assistant Professor Aydan Mehmed Haka, PhD for the academic position "Associate Professor"** in the professional field 5.3. Communication and Computer Engineering, subject "Fundamentals of computer communications" at the department "Computer science and technology" of Technical university of Varna.

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RE

/Prof. Teodor Iliev, PhD/