

OPINION

Subject: Participation of *Chief Assistant Ekaterina Angelova Otsetova-Dudin, PhD* in a competition for attaining the academic position of “Associate Professor” in professional field 5.3. Communication and computer technology, announced in SG, issue 45 of 28.05.2021, for the needs of department “Communication Systems and Services”
by Chairman of the Scientific panel: *Assoc. Prof. Rumen Dimov Andreev, PhD*

1. Compliance with legal requirements

The competition was announced in “State Gazette”, issue 45 of 28.05.2021, for the needs of IICT-BAS, department “Communication Systems and Services”. The only candidate is Chief Assistant Ekaterina Angelova Otsetova-Dudin, PhD. As Chairman of the Scientific panel appointed by order no. 178-1 of 16.07.2021 of the Director of IICT-BAS pursuant to Art. 4, para. 2 of the Act on Development of the Academic Staff in the Republic of Bulgaria (ADASRB) and a decision of the Scientific council of IICT (minutes no. 6 of 23.06.2021), I have received a complete set of documents that meet the requirements for attaining the academic position of “Associate Professor”. According to the requirements of the “Regulations of specific conditions for attaining scientific degrees and for holding academic positions at IICT-BAS”, candidates for the academic position of “Associate Professor” in scientific field “Technical Sciences” and professional field 5.3 Communication and computer technology must have scientometric indicators exceeding the following minimum thresholds: *for group of indicators B* - 100 points and minimum 10 publications in editions that are referenced and indexed in Scopus or WoS; *for group of indicators C* - 220 points; *for group of indicators D* - 60 points; *for group of indicators E* - 20 points.

The points calculated by the candidate for all indicators, which I accept without any remarks, are: *for group of indicators B* - 151.07 points and 10 publications are presented in editions referenced and indexed in Scopus or WoS; *for group of indicators C* - 227.36 points; *for group of indicators D* - 172 points; *for group of indicators E* - 110 points. The candidate satisfies the formal requirements of the Regulations and exceeds them significantly in all indicator groups.

2. Short biographical information about the candidate

Chief Assistant Ekaterina Angelova Otsetova-Dudin graduated with a master's degree from the Technical University, Sofia, in 1992. In 2015, she defended her doctoral dissertation at “Angel Kanchev” University of Ruse in professional field 5.3 Communication and computer technology on the topic of “Modeling and Simulation of rare events in the handover of wideband cellular radio networks”. She has specialized as a teacher on electrotechnics in HPI “Neofit Rilski” – Blagoevgrad and as an extracurricular lector in SU “Kliment Ohridski”, Sofia. Since 2015, she is Chief Assistant in department IT of the Faculty for telecommunications and management at the University of Telecommunications and Posts, Sofia, in professional field 5.3.

3. General description of the scientific research and applied activity of the candidate

The habilitation work with which Chief Assistant Ekaterina Otsetova-Dudin participates in the competition, is based on scientific publications. She presents 12 scientific publications, referenced and indexed in Scopus or WoS, and 21 scientific publications in non-refereed journals and collective peer-reviewed scientific publications. Some of the non-refereed publications (11 publications) are available on the Internet through the following databases - Google Scholar, Index Copernicus, EBSCO and ResearchGate. One published university textbook is presented. The candidate has provided 16 noted citations in publications visible in the global scientific databases Scopus and Web of Science, and 6 in

non-refereed scientific peer-reviewed journals. Dr. Ekaterina Otsetova has participated in 10 research projects, of which 1 under OP "Human Resources Development", 2 funded by the Ministry of Education and Science, 6 research projects of various Bulgarian universities and one project with a company.

3.1. Publications related to the habilitation work

The habilitation work of the candidate is in two main research fields: Computer methods for simulation and Development of computer systems for laser projection for the purposes of industrial applications. The second research field is part of a wider research field of the research activities of the candidate, which is summarized as sensor computer systems. Pursuant to Art. 25, para. 1, item 3 of the ADASRB, the habilitation work is defended with 10 scientific works published in editions that are indexed and referenced in world-famous databases of scientific information (Scopus and Web of Science). Four of these publications are published in journals with SJR impact rank. It should be noted that Chief Assistant Ekaterina Otsetova is the first author in 2 of the publications.

3.2. Publications supplementing the habilitation work

The publications belonging to this group can be subdivided as follows:

- Scientific publications referenced and indexed in Scopus and Web of Science - 2 pcs.;
- Scientific publications in peer-reviewed scientific journals not referenced in Scopus and Web of Science but accessible on the Internet through other well-known databases - 11 pcs.;
- Scientific publications in peer-reviewed scientific journals and collective scientific works not referenced in Scopus and Web of Science and not accessible on the Internet - 10 pcs.

4. Main scientific and applied contributions

Dr. Ekaterina Otsetova has presented a detailed reference of the contributions resulting from her research that are reflected in the presented publications. The contributions are grouped into scientific, scientific-applied and applied ones. According to ADASRB, only scientific and scientific-applied contributions are taken into account when awarding the position of an associate professor. These contributions relate to the following research fields: Sensor computer systems, Application of methods of accelerated simulation for the verification of wireless networks, Application of approximation methods in the synthesis of technical means in communication technology, Remote data exchange in medicine and Protection of computer and communication networks and systems.

4.1. Scientific contributions

- Analysis of the effectiveness of multimedia laser projectors in the work environment and identification of problematic aspects;
- Methods for mobility management in 5G, 6G and Next Generation Wireless Networks;
- Method for diagnostic assessment of the condition of the cardiovascular system, based on remote recording of a pulse line, photoplethysmographically taken from a patient's finger and subsequent processing;
- Concept for remote data exchange for recording the health status of patients for the purposes of consultations, monitoring of physiological indicators of the body, distance learning and management of the medical care system;
- A method for protection (based on the ModSecurity module) of web-based applications from hacker attacks and vulnerabilities on the side of the server operating system is proposed, which provides real techniques for protection against different kinds of attacks - HTTP, DoS, DDoS and SQL injections.

4.2. Scientific-applied contributions

- An adaptive approach to laser projection by a projector with one or more semiconductor laser diodes and at least two rapidly rotating mirrors deflecting the laser beam for the purpose of projection on a two-dimensional surface is proposed;
- An approach in the field of human-machine interface, described by UML, is proposed, which allows the user to control a computer through gestures using a Kinect sensor;
- An advanced algorithm for simulation study of the probability of occurrence of rare events and estimation of QoS parameters in IPv6 based network architectures has been developed. It is implemented on the basis of the method for accelerated simulation RESTART (REpetitive Simulation Trials After Reaching Thresholds), combined with a restriction of the relative error LRE;
- A simulation platform for evaluation of the efficiency of signal transmission in various traffic models of fifth generation networks is proposed. It is based on the method for accelerated simulation RESTART/ LRE;
- An approach for selecting the type of wireless network based on a comparative analysis of IEEE 802.11, 802.16 and 802 standards is proposed: The influence of the network structure, the number of nodes and the connections between them, the number of channels in the base station and the handover queues on network bandwidth is studied;
- The function with double modulation is used in the approximation method of compressed cosines to estimate the approximation error in the synthesis of one-dimensional digital filters;
- An approach is proposed to increase the security of data transmission in computer and industrial networks after studying the possible types of attacks. A mechanism for making the most effective decision in the design and operation of ZigBee networks is proposed, as well;
- An integrated approach and policies for the effective protection of a management system for communication networks are proposed. The nodes of the communication network are composed of an object and a management application. The connection is implemented based on the Simple Network Management Protocol (SNMP).

5. Critical remarks and recommendations

One necessary critical remark is related to the structure of the reference of the original scientific and scientific-applied contributions:

- Not enough attention has been paid to the correct classification of the contributions as scientific, scientific-applied and applied ones.

CONCLUSION

The candidate **satisfies the requirements of the ADASRB and the Regulations on the Implementation of the ADASRB**. The quantitative indicators of the Regulations of IICT-BAS for awarding the academic position of “Associate Professor” are satisfied. I give my **positive vote** for Chief Assistant Ekaterina Angelova Otsetova-Dudin, PhD to attain the academic position of “Associate Professor”.

I propose to the members of the Scientific panel to vote for awarding the academic position of “Associate Professor” in professional field 5.3. Communication and computer technology, scientific field “Technical sciences” at department “Communication Systems and Services” of IICT-BAS to Chief Assistant Ekaterina Angelova Otsetova-Dudin, PhD.

Sofia,
September 13, 2021

Chairman of the Scientific Panel

