REVIEW

by Professor Todor Stoyanov Djamiykov, Eng., PhD, Technical University - Sofia
of the materials submitted for participation in the competition for the academic position of "Professor" of Plovdiv University "Paisii Hilendarski" in the field of higher education 5. Technical sciences, professional field 5.3. Communication and computer engineering (Automation of areas of the intangible sphere - education, science). In the competition for "Professor", announced in the State Gazette, no. 92 of 18.11.2022 and in the Internet page of Plovdiv University "Paisii Hilendarski" for the needs of the Department of Electronics, Communications and Information Technologies, Faculty of Physics and Technology, as a candidate participated Dr. Eng. Dimitar Mihailov Tokmakov, Associate Professor.

1. General description of the materials presented

By Order No. RD-21-329 of 15.02.2023 of the Rector of Plovdiv University "Paisii Hilendarski" (PU) I have been appointed as a member of the scientific jury of the competition for the academic position "Professor" in PU in the field of higher education 5. Technical Sciences, professional field 5.3. Communication and Computer Engineering (Automation of areas of intangible sphere - education, science).

For participation in the announced competition have been submitted documents by a single candidate: Ph. Prof. Dimitar Mikhailov Tokmakov.

The application submitted by Dr. Eng. Dimitar Tokmakov, the set of materials is in compliance with the Regulations for the Development of the Academic Staff of the University of Economics and includes the following documents: application for admission to the competition; curriculum vitae; diplomas for the master's degree and for the educational and scientific degree "PhD"; list, annotations and copies of the scientific works, list of citations, reference for fulfillment of the minimum national and additional faculty requirements, annotation of the materials under Art. 65 of the PRASPU, self-assessment of contributions, declaration of originality and authenticity of the materials; and copies of the declarations of compliance specified in Annex 1 of the PPNSAS, certificate of work experience, documents for academic work, documents for participation in research projects.

The applicant, Dr. Eng. Dimitar Tokmakov has attached a total of 67 scientific papers. The list includes a dissertation for the acquisition of the scientific and educational degree - PhD. 1 textbook and 1 textbook and references for participation in 12 scientific research projects. 33 scientific works are accepted for review, which are outside the dissertation and those for the academic position of associate professor. They are taken into account in the final evaluation of how and 2 teaching aids and 12 scientific research projects. The distribution of the research papers by relevant headings shows that all of them were presented at conferences, most of them international. There are 30 in the country and 3 abroad.

A list of 46 noted citations is presented. Documents (in the form of an official note and a reference) for participation in 12 research projects are also presented.

2. Information about the candidate

Dr. Dimitar Tokmakov was born in 1967. He graduated from secondary school in 1989. Since 1994 he has been a Master Engineer in Electronic Engineering and Microelectronics, from Technical University - Sofia. In 2011 he defended his dissertation thesis on "Distributed Internet-based environment to support training in engineering education" and obtained the degree of Doctor of Education and Science in the scientific specialty 5.2 - Electronics, Electrical Engineering and Automation from the Technical University - Sofia. Dr. Eng. Dimitar Tokmakov began as an assistant professor at the Department of ECIT, Faculty of Physics and Technology of Paisii Hilendarski University of Sofia, in the scientific specialty 5.3 "Communication and Computer Engineering. Since 2013, he has been an associate professor at the Department of ECIT of Paisii Hilendarski University.

3. General characteristics of the candidate's activity

The submitted materials, lists and memos show the extensive teaching activities carried out by the candidate in the last 5 years. The teaching load during the period ranges from 400 to 500 hours. This is a sufficiently high workload. During this period he has taught classes, lectures and exercises in between 6 and 8 subjects per year. He was involved in the preparation and adoption of the curricula of the Bachelor's degree course in 4 disciplines and of the Master's degree course in 7 disciplines. The presented materials eloquently show the active classroom and extra-classroom teaching activities of Dr. Dimitar Tokmakov in working with students.

From the submitted list with a total of 67 publications, beyond those for the PhD and the academic position of Associate Professor, I accept 33 for review and should be counted for the final grade.

All publications were made at conferences and scientific publications in Bulgaria and abroad. One publication is independent, 20 have one co-author, 3 have two co-authors and 8 have more co-authors. 13 scientific publications are in non-refereed peer-reviewed journals or in edited collective volumes. Three of the publications are in forums abroad. The review of all publications shows that they are distinguished by analytical and knowledge of the state-of-the-art of circuit solutions, mathematical and simulation models for reducing energy consumption of wireless sensor nodes. Multi-layer heterogeneous network architectures, their cloud layer and the required server-server software application. They have scientific and applied relevance directly related to the current competition for "Professor" at PU in higher education area 5. Technical sciences, professional field 5.3. Communication and computer engineering (Automation of areas of the intangible sphere - education, science) I accept the publication activity as fully sufficient in volume, at a high level and sufficiently promoted in national and international scientific terms.

The precise comparison of the approved in the table "Minimum national requirements" for the opening of the procedure for filling the academic positions of "Principal Assistant Professor", "Associate Professor" and "Professor" in professional fields with the presented by Dr. Eng. Dimitar Tokmakov's table (6. Reference for the minimum national requirements. docx) confirm and fully cover the minimum national requirements.

This statement of fulfilled and exceeded minimum national requirements can be demonstrated on the basis of the following sequence when analysing the evidence presented in the documents for the present competition for the title of "professor", as follows. Habilitation thesis submitted - scientific publications (not less than 10) - 100 points; List D: minimum number of points - 200. 10 publications - 306,31 points in total; List E: minimum number of points - 50. 13 publications submitted, total 460 points.

The 33 scientific publications submitted for the present competition "habilitation work - scientific publications (not less than 10) in publications that are refereed and indexed in world-known databases of scientific information" on the extremely topical problem of lowering the consumption and prolonging the lifetime of the power supply batteries of sensor modules are a significant volume of scientific production of Dr. Dimitar Tokmakov, which definitely gives grounds for an excellent evaluation in determining the overall characteristic of the scientific research and scientific-applied activity.

All the presented scientific publications are in the field of the competition. They are subject to analysis in the very detailed self-assessment of the contributions made by Dr. Dimitar Tokmakov according to group of indicators B and group of indicators G by thematic areas. Regardless of their general focus in the field of the competition, they can be divided and analysed in the following areas:

Contributions formulated by publications in refereed journals, list B:

1. Innovative schemes are proposed to reduce the energy consumption of wireless sensor nodes with LoraWan communication interface in low-power mode - "deep sleep" by using nano timer. A 4-layer heterogeneous network architecture is developed to collect data from heterogeneous sensor nodes - with Zigbee and LoraWan interface (B3, B6, B9):
2. A mathematical and simulation model in the MATLAB environment of the energy lifecycle of a battery-less wireless sensor node is proposed to size and optimize the values of the B9 building blocks.
3. A methodology for thermal evaluation, simulation and characterization of electronic equipment is proposed - implemented, adapted and applied in the teaching process (B5, B1).
4. Original hardware and software solutions for fruit grading by image processing are proposed.

Contributions formulated by publications in peer-reviewed journals, list G

1. An energy efficient LoRaWAN protocol has been proposed and implemented to reduce the energy consumption [D7.5].

2. An original design of a batteryless wireless sensor node with LoRaWAN communication interface for IoT applications is developed and investigated [D7.3].

3. Optimization of the electrical power consumption of a wireless sensor node with a LoRaWan interface and an ESP32 microcontroller , by using the low-power co-processor in the Xtensa® 32-bit LX6 structure, has been done [D7.4].

4. A scheme for a computer-based system for measuring the current and energy profile of wireless sensor nodes with the capability of measuring small currents in the "deep sleep" mode of wireless sensor nodes with large dynamic range is proposed [D7.6].

5. An original design of a wireless sensor node powered by a battery-less energy converter and an ultrasonic sensor has been developed to measure the amount of garbage in waste receptacles in urban environments in the context of "smart cities" [D7.8].

6. The development of an autonomous sensor for the presence of parked cars in parking areas based on an ultrasonic distance sensor, and an energy converter with LoraWan communication interface in the context of "smart cities" is proposed [D7.9].

It is quite reasonable to summarize, on the basis of the presented scientific publications and the contribution report compiled by Dr. Dimitar Tokmakov, that the main contributions are scientific and applied. They are closely related to the presented applied contributions and are also the basis for their application in the teaching process and in the development of scientific projects (list of scientific research projects presented).

The importance of the contributions in the scientific publications is confirmed by the 42 citations from other scientists from Bulgaria and abroad.

4. Evaluation of the personal contribution of the candidate

I believe that the personal contribution of Dr. Dimitar Tokmakov in the publications presented to the scientific community is undeniable and substantial. I have checked in "SCOPUS" the presence of 19 documents, h-factor - 4, 12 co-authors and 43 citations. In the higher number of citations, there are no author citations, which is commendable. The statistics on the number of co-authors in the publications shows: independent - 1, with one co-author - 20, the last 12 publications have more than two co-authors. The majority is at the beginning of the list of authors, which indicates the significant share in the formation and presentation of publications.

5. Critical comments and recommendations

I have the following remarks to the evaluated materials presented in the competition, which do not diminish the significance of the obtained results, but rather can be seen as recommendations for the future creative activity of Dr. Dimitar Tokmakov.

1. The summaries and judgments on the results of the publications could be made in a more exact way, which would lead to a more precise and representative formulation of the contributions.

2. I would recommend to focus and devote time to an extensive and detailed summary of the use of modern hardware and software solutions for lowering the energy consumption of networked wireless sensor nodes, as well as their implementation in the learning process of students, which to publish actively in prestigious foreign high-ranking journals.

6. Personal impressions

I do not know Dr. Eng. Dimitar Tokmakov. I have no publications in common with him and I am not a related person within the meaning of the law.

Conclusion

The documents and materials submitted by Dr. Eng. Dimitar Tokmakov meet all the requirements of the Academic Staff Development Act in the Republic of Bulgaria (ASDA), the Regulations for the Implementation of the ASDA and the relevant Regulations of the Paisii Hilendarski University.

A sufficient number of scientific works published after the materials used in the defence of the PhD are presented. In the candidate's works there are original applied and applied contributions which have received recognition as a representative part of them have been published in scientific collections issued by academic publishing houses. The developments have practical applicability, and are directly oriented to educational work. The scientific and teaching qualifications of Dr. Eng. Dimitar Tokmakov cannot be questioned.

The achievements of Dr. Eng. Dimitar Tokmakov results in teaching and scientific research activities, fully comply with the specific requirements of the Faculty of Physics and Technology, adopted in connection with the Regulations of the PU-"Paisii Hilendarski".

After familiarizing myself with the materials and scientific works presented in the competition, the analysis of their significance and the scientific, scientific-applied and applied contributions contained in them, I confidently give my positive assessment and recommend the Scientific Jury to prepare a report-proposal to the Faculty Council of the Faculty of Physics and Technology for the selection of Dr. Eng. Dimitar Tokmakov to the academic position of Professor of Plovdiv University "Paisii Hilendarski" in the field of higher education 5. Technical sciences, professional field 5.3. Communication and computer engineering (Automation of areas of the intangible sphere - education, science).

14 April 2023 Reviewer: .....

(Prof. Todor Stoyanov Djamiykov, Eng., PhD)