



## OPINION

on a competition to occupy an academic position "Associate Professor" In field of higher education 5. "Technical Sciences", professional direction 5.2 "Electrical Engineering, Electronics and Automation", scientific specialty "Elements and devices of automation and computing (Sensors and sensor devices)", declared in the State Gazette, issue 93/26.11.2019 for the needs of the "Prof. Assen Zlatarov" University

**Reviewer: eng. Anna Vladova Stoynova, PhD, Professor, Technical University – Sofia**

Documents were submitted for the competition from the sole candidate Dr. Eng. Ivaylo Raychev Belovski, Chief Assistant Professor in the Department of Electronics, Electrical Engineering and Mechanical Engineering at the "Prof. Dr. Assen Zlatarov" University.

### **1. Review of the content and results of the submitted works**

The candidate submitted a total of 29 scientific works for his participation in the competition, of which:

- One monograph, co-authored (with proven involvement in writing over 100 pages);
  - 7 publications in refereed and indexed in world scientific information databases (SCOPUS / WOS);
  - 13 publications in non-refereed scientific peer-reviewed journals, such as 7 of them are in the editions included in the National Reference List of Contemporary Bulgarian Scientific Editions with Scientific Review;
  - 3 reports from international conferences abroad;
  - 5 reports at international conferences in Bulgaria whose collections are included in the National Reference List of Contemporary Bulgarian Scientific Editions with Scientific Review;
- Of the 28 scientific articles and reports, respectively
- 14 are written in English, 1 - in Turkish, 1 - in German and 12 - in Bulgarian;
  - 5 are independent (of which 3 are in English and 2 in Bulgarian), 8 are in English. are with two co-authors, 8 with three co-authors, 6 are with four co-authors and 1 with five co-authors.

I accept for review all 29 scientific papers presented. Also presented are 3 study aids (1 self-study and 2 co-authorship). Dr. I. Belovski has the h-index 2 and has noticed citations of his works, respectively 10 pcs. in SCOPUS (on 7 issues), 1 in a monograph published in Bulgaria and 1 in an unpublished scientific peer-reviewed journal published abroad.

The documents submitted by the applicant in the competition are in full compliance with the requirement of Art. 67 (2) from RIADAPRB at the "Prof. Dr. Assen Zlatarov" University.

### **2. General characteristics of the applicant's activities**

#### **2.1. Educational and pedagogical activity**

The teaching and pedagogical activity of the applicant at the “Prof. Dr. Assen Zlatarov” University is significant and diverse. He started working as an assistant professor in September 2012 in the EEM department of the University. For the period of more than 7 years work, respectively, as an assistant professor until October 2016 and as chief assistant professor till now, he has developed 5 Bachelor's Degree Programs and 1 for Master's Degree in Electronics major, as well as 1pc. for the Bachelor Degree in Software Engineering. In the last 3 years he had a total of a total of 2170 hours of lectures and exercises (466 hours of which were lectures) or an average of 723 hours of study, of which 155 hours lectures in a total of 13 different Bachelor's and Master's degree courses, full-time and part-time courses in electronics, electrical engineering and computer systems and technologies in the subject area of this competition.

Since 2014 21 diploma works are successfully defended under the leadership of I. Belovski. He has been involved as an academic mentor in the BG05M20P001-2.02-0001 Student Practices project. In the period 2015-2019 he has managed 5 students in the specialty "electronics" to participate in the "NS for students, PhD students and young researchers" who were ranked respectively 1 for the first, 2 for second and 1 for the third prize.

I. Belovski is the author of the "Manual for Laboratory Exercises in Electronics Measurement", "Prof. Assen Zlatarov", University, 2019, ISBN 978-619-7559-00-2 and co-author of two other teaching aids: Belovski I., Y. Georgiev, P. Rakhnev, Manual for Laboratory Exercises in Semiconductor Elements, “Prof. Assen Zlatarov” University, 2014, ISBN 978-619-7123-12-8; Belovski I., P. Rakhnev, Laboratory Manual for Semiconductor Elements and Modules, “Prof. Assen Zlatarov” University, 2019, ISBN 978-619-7123-88-3.

At the same time, Dr. I. Belovski participated in courses for advanced training in the project BG051PO001-3.1.09-0011 “Academic career development - the key to establishing a new type of university”.

## **2.2. Scientific and applied scientific activity**

The applicant's research and applied activity is rich and diverse. He is impressed by his participation in numerous research and educational projects, where he successfully integrates with researchers and colleagues from BAS, other universities and industry.

I. Belovski participated as an expert in the international project “ENGAGE” under the Erasmus + program. He worked as a "researcher" for the National Science Program "Young Scientists and Postdoctoral Fellows". He participated as a member of the team in a research project at FNIDN07 / 18 of 12/15/2016 "A New Non-Destructive Method for Surface Surface in Semiconductor Structures". He has directed one University project NIH-402/2017 “Design and implementation of a thermoelectric cooler powered by a photovoltaic system” and is a participant in 7 more University projects. He has also participated in one project of OP Navigation Equipment Modernization - 2017, with a Financing Organization: Port Infrastructure AD.

## **2.3. Implementation activities**

No references for embedded development have been provided, but the topics of the research projects are largely application oriented and it is understood that some of the developments have found specific applications, in addition to the teaching activity.

### **3. Contributions and relevance to science and practice.**

I accept the contributions in the applicant's copyright reference, and summarize the scientific, applied, applied and methodological contributions by groups:

*1. Scientific monograph:* Belovski I., A. Alexandrov, Research and modeling of thermoelectric energy converters, "Prof. Dr. Asen Zlatarov" University, 2019, ISBN 978-619-7123-99-9

1.1 Theoretical and experimental models of thermoelectric module systems have been developed based on the real results of experimental studies. The neural network apparatus was used to create an analytical model of a thermoelectric cooling system. A user application for calculating the basic thermo-physical parameters of Peltier modules is proposed.

#### *2. Scientific publications*

2.1 Investigation and optimization of the characteristics of thermoelectric modules and systems [2.5 ÷ 2.7, 3.7, 3.9 ÷ 3.13, 3.14, 3.16, 3.19, 3.20].

2.2 Process modeling in thermoelectric modules and systems [3.3, 3.4, 3.6, 3.17].

2.3 Application of neural networks and intuitionist fuzzy sets to the study of thermoelectric systems [2.1 ÷ 2.4, 3.15].

2.4 Proposed technical solutions for applied sensor systems and process control models [3.1, 3.2, 3.5, 3.8, 3.18, 3.21].

#### *3. Educational and methodological contributions*

3.1 Providing methodologies and development of laboratory productions for training students in different disciplines. Creation of a basis for the development of students' practical skills in working with different measuring instruments in the study and characterization of semiconductor devices, thermoelectric refrigerators and generators [5.1 ÷ 5.3].

Generally, I classify scientific-applied contributions as creating new models (analytical and experimental-theoretical) of thermoelectric modules and systems and new methodologies for characterizing the parameters and optimizing their processes.

The applied contributions are related to the use of known approaches and means for the implementation of new technical solutions (of the sight warning device for the blind, the digital thermostat for domestic water heating installations, the signal generator with direct digital frequency synthesis, the multisensory parameter reading system of the environment).

The methodological contributions are the creation of a "computer laboratory" for modeling processes for application in the educational process.

### **4. Assessment of the applicant's personal contribution**

The applicant's scientometric data exceeds the national minimum requirements as well as some of the indicators of "Prof. Dr. Assen Zlatarov" University for the academic position "Associate Professor" and are: 50 points for group of indicators "A"; 100 points for group of indicators "B"; 315.02 points for "G" group; 105 points for "D" group; 106.7 points for "E" indicator group.

Applicant's personal contribution is significant to the theory and practice of modeling, researching and optimizing thermoelectric modules and systems, application sensor system development and process management.

I. Belovski's personal contribution to the educational activity is also serious and successful.

In general, all the necessary requirements and indicators have been exceeded, taking into account Art. 67 and Art. 69 of the Rules on the Terms and Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions at the "Prof. Dr. Assen Zlatarov" University.

### **5. Critical notes and recommendations**

- The number of authors in the List of Scientific Publications is different from that in the submitted publication [3.2].
- Publications with numbers [3.3] and [3.4] were omitted in the List of Scientific Publications.
- I recommend that the applicant boldly publish his or her research in peer-reviewed journals in order to promote the results achieved more widely among international scientific circles.

### **6. Personal impressions**

I don't know Assistant Professor Ivaylo Belovski, PhD, but I am impressed by the competition documents as a candidate with competence in modern technologies in the scientific field of the competition and a sense of applied research, with potential for realization as an erudite lecturer at the University.

### **7. Conclusion**

**In view of the foregoing, I propose Ch. Assistant Professor Ivaylo Raychev Belovski, PhD to be selected as Associate Professor in Higher Education Area 5 Engineering sciences, professional field 5.2 Electrical Engineering, Electronics and Automation, specialty "Automation and Computing Elements and Devices" (Sensors and Sensor Devices) ).**

16.03.2020  
Sofia

Gave an opinion: \_\_\_\_\_

/Eng. A. Stoyanova, PhD, Professor/