

## REVIEW

on the application package submitted for participation in the competition for the academic position of "**Associate Professor**" in the field of higher education "**5. Technical Sciences**", professional field: "**5.3. Communication and Computer Equipment**", scientific speciality "**Intelligent Control Systems**", for the needs of the Department of Computer Systems and Technologies of the "Faculty of Technical Sciences" at the University "Prof. Dr. Asen Zlatarov" – Burgas. The competition was announced in State Gazette No.70 of 20.08.2024.

Candidate: Ch. Assist. Prof. Eng. Todor Petkov Petkov, PhD.

Reviewer: Prof. Todor Dimitrov Ganchev, PhD.

### 1. General information

The only candidate who has applied and was admitted to participate in the current competition for the acquisition of the academic position "Associate Professor" is Ch. Assist. Prof. Eng. Todor Petkov Petkov, PhD. The candidate graduated with a qualification "Professional Bachelor", obtained the "Master" degree, and earned a PhD in "Computer Systems and Technologies" from the University "Prof. Dr. Asen Zlatarov" – Burgas, in 2010, 2012 and 2016 respectively. The topic of his dissertation "Generalized Modelling of Neural Networks" aligns well with the scientific specialty of the current competition.

In 2016, Dr Todor Petkov was appointed an Assistant Professor at the University "Prof. Dr. Asen Zlatarov" – Burgas. Since 2018 he has been a Chief Assistant Professor at the Department of Computer Systems and Technologies of the Faculty of Technical Sciences at the same University. During the academic year 2023/2024, his teaching duties included laboratory exercises in five academic courses for Bachelor students and three academic courses for Master students. He also taught lectures in the courses "Programming of Mobile Devices" for Bachelor students as well as "Programming of Mobile Robots" and "Computer Systems and Technologies – Module Programming" for Master students. These courses correspond or are thematically aligned to the current competition.

### 2. Overall description of the application package

When evaluating Dr Petkov's application package, I considered the requirements set in the *Regulations on the terms and conditions for acquiring scientific degrees and occupying academic positions of the University Prof. Dr Asen Zlatarov" – Burgas*, according to which the requirements for indicators "G," "D," and "E" exceed the minimum national requirements.

To fulfil the requirements for the Associate Professor position, Dr Petkov presented 32 publications and one manual for laboratory exercises. These publications can be described as 9 articles in peer-reviewed scientific journals and 23 papers presented at scientific conferences. Three of these publications he authored alone, and the remaining 29 were co-

authored with colleagues from the University "Prof. Dr. Asen Zlatarov" – Burgas, Technical University of Gabrovo and the Bulgarian Academy of Sciences. Some of these publications were co-authored with colleagues from foreign universities. The observed interaction with a wide range of Bulgarian and international researchers is a reliable indication of the candidate's teamwork skills and the establishment of successful collaborations.

The application package does not include lists of publications used to obtain the PhD degree and the Chief Assistant Professor position. Therefore, here I express my opinion about the lack of duplication with the publications used in the current competition for Associate Professor based only on indirect observations. Namely, out of all 32 publications used in this competition, only one (No. 31 from group G.8) precedes the acquisition of his PhD degree in time. Thus, I assume that respecting Bulgarian law, the candidate made the required effort to ensure that there is no duplication between papers used in the current and previous procedures.

After reviewing the provided lists and the full text of the publications, I accept all 32 papers for review in their full volume.

In short, the applicant has provided information in the required volume to meet the minimum requirements for the relevant groups of indicators: "A", "B", "G", "D" and "E" according to the national regulations and these of his host institution. In essence, I consider the requirement for indicator "A" to be satisfied as Dr Petkov has obtained a PhD with a dissertation, entitled "Generalized Modeling of Neural Networks", matching the thematic area of this competition.

To meet the requirements for the group of indicators "B", Dr Petkov has provided a list of 11 publications that are indexed in Scopus, grouped thematically as equivalent to a habilitation thesis (indicator "B.4"). Among these are 5 research articles published in scientific journals and 6 papers presented at scientific conferences. In 3 of these publications, Dr Petkov is the first co-author, in 1 is the second, in 1 is the third, in 2 is the fourth, in 1 is the fifth, in 1 is the sixth, in 1 is the seventh and in 1 is the tenth. Considering the co-authorship statements for equal contribution of all co-authors, it can be concluded that the candidate contributed to the preparation of co-authored publications.

To meet the requirements for the group of indicators "G", the applicant has submitted two lists with 21 publications. Specifically, 15 of these publications are listed under indicator "G.7" – publications indexed in the Scopus database – in 3 he is the sole author and 12 were co-authored. In the co-authored publications, Dr Petkov is the first co-author in 4, in 6 he is second and in 2 he is fourth. Under the indicator "G.8", Dr Petkov has presented a list of 6 publications not indexed in Scopus or Web of Science – in 3 he is the first author, 2 he is second, and 1 is the fourth co-author.

To meet the requirements for the group of indicators "D" Dr Petkov has presented a list of 89 citations by other authors under indicator "D.12". Current fact checks (as of 23.12.2024) in the Scopus database show 114 citations and Scopus h-index = 6, with auto-citations excluded from all co-authors.

To meet the requirements for the group of indicators "E" the applicant has provided two lists with a total of 7 projects, including 2 national projects under indicator "E.18" and 5 international projects under indicator "E.19".

In Table 1, I present the evaluation scores calculated based on the evidence provided in the application package in comparison with the institutional requirements of the University "Prof. Dr Asen Zlatarov" – Burgas. The comparison presented in the table shows that Dr Petkov fulfils the institutional requirements for acquiring an "Associate Professor" position in the field of higher education "5. Technical Sciences". In terms of indicator "D," he significantly exceeds the requirements.

**Table 1.** Groups of indicators for the field of higher education "5. Technical Sciences" required for the acquisition of the "Associate Professor" position according to the institutional requirements of the University "Prof. Dr Asen Zlatarov" – Burgas.

Indicator group	Content by indicators	Minimum requirements for the acquisition of the position "Associate Professor"	Scores of Dr. T. Petkov
A	Indicator 1	50	50
B	Indicator 3 or 4	100	102.08
G	The sum of indicators from 5 to 11	300	309.84
D	The sum of indicators from 12 to 15	100	890
E	Indicator 16 to 28	100	120

### 3. General characteristics of RTD activities

Among the 32 publications accepted for review, 26 (approx. 80%) are indexed in Scopus. The share of scientific publications aimed at developments with neural networks (19 items) indicates a sustained interest in their application in solving a wide range of problems. Three publications explore the possibilities for predicting the characteristics of chemical compounds, another 3 are aimed at supporting training in various academic disciplines and one is aimed at evaluating the qualitative and quantitative characteristics of universities and scientific organizations. The candidate's contributions to these publications are considered applied research and RTD.

According to the provided information, Dr Petkov has participated in 13 projects, among which: 6 institutional funded by the "Research and Artistic and Creative Activities" and "General University Scientific Grants" funds of the University "Prof. Dr. Asen Zlatarov" – Burgas, 2 national and 5 international projects.

### 4. Evaluation of pedagogical training and activity

Dr Petkov's pedagogical activity covers nearly 9 years -- from his appointment as an Assistant Professor at the Department of Computer Systems and Technologies at the University "Prof. Dr Asen Zlatarov" – Burgas in 2016 until now.

As shown in the application package, in the last three academic years a total of 210 lecture hours have been planned for Dr Petkov. These teaching duties cover 135 lecture hours in two disciplines included in the curricula of Bachelor students and 75 lecture hours for Master students.

Dr Petkov is a co-author of the laboratory manual on "Digital Circuit Design" published by the University "Prof. Dr Asen Zlatarov" - Burgas. According to the manual's Preface, the candidate has co-authored three laboratory exercises: # 2, #3 and #4.

According to the information provided, Dr Petkov has supervised the development of 11 diploma theses, which is a reliable indicator of the successful transfer of the accumulated experience to students.

## **5. Main contributions**

I take into account that the 32 publications presented in the competition reflect a significant amount of RTD activity. The candidate has presented a summary of the most significant contributions for each publication, dividing them conditionally into 4 groups. From my perspective, these contributions can be summarised as:

- Synthesis and adaptation of neural networks for addressing application-oriented problems.
- Predicting the characteristics of chemical compounds.
- Supporting learning.

In essence, the contributions reported in the presented publications can be summarized as follows: experimentally obtained new data, proving by new means already existing theories and hypotheses and confirmatory data, synthesis of new algorithms and models with neural networks, developed analysis methodologies and improved evaluation of neural networks.

Analysing the composition of the coauthors' team of the joint publications and taking into account the provided co-authorship contribution protocols signed by all co-authors, I assume that Dr Petkov has made a concrete contribution to the results achieved in the majority of joint publications.

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

Regarding the significance of the contributions formulated in the publications of Dr Petkov, I am guided by the significant number of citations by independent authors and by his participation in international research projects:

- (1) Dr Petkov has participated in 5 international research projects, which is an excellent attestation of the significance and practical benefit of his research and applied activities.
- (2) The publications co-authored by Dr Petkov have received 114 citations (visible in the Scopus database as of 23.12.2024), mostly from independent foreign authors. This is a reliable indicator that these developments have attracted the attention of researchers working on similar topics. At present (as of 23.12.2024), Dr Petkov's Hirsch index, calculated based on the publications visible in the Scopus database is  $h\text{-index}=6$ , which, according to my observation, is above the average for tenured academic staff in Bulgaria.

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

I have no critical remarks about the candidate. Based on the documentation provided, I can conclude that T. Petkov, PhD, is a hard-working researcher and lecturer who has built the necessary skills for teamwork and standalone research pursuit. I express my satisfaction that the research teams at the University "Prof. Dr Asen Zlatarov" – Burgas have developed the capacity needed to create quality research and teaching staff for universities.

Concerning the compilation of the documentation provided in the application package, I can note that in my opinion, it would be appropriate to include the lists of publications used for the acquisition of the PhD degree and the Chief Assistant Professor position. The availability of short summaries of all publications, including a description of the contributions, main results and conclusions, would significantly help the analysis of the candidate's achievements (and in addition could also be useful in planning his future research activities.) The provided professional biography (file "03 Творческа биография.pdf") of the candidate could be supplemented factually to give a comprehensive and complete description of his education and career development. In the file "Справка Декларация.pdf" there are factual inaccuracies in the indication of the funding programs for the projects under indicator "E.19". In some documents, typos were observed.

## 8. Personal impressions of the reviewer

I declare that at the time of my inclusion in the current scientific jury, I did not know closely the career development and work of the candidate, so my conclusions regarding the scope and degree of his competencies were made solely based on the application package submitted for participation in the current competition for the "Associate Professor" position, information available on the website of the University "Prof. Dr Asen Zlatarov" – Burgas and the world databases with scientific publications Scopus and WoS.

While reviewing the candidate's research and teaching activities, I was convinced that Dr Petkov has the necessary professional experience and a high level of competence that can be useful for the University "Prof. Dr Asen Zlatarov" – Burgas, both in training students and graduates and implementing complex RTD projects.

## CONCLUSION

The application package submitted for consideration in the current competition allows for an objective and multifaceted assessment of the qualities of Chief Assist. Prof. Dr Eng. Todor Petkov Petkov. A formal comparison of the submitted documents with the uniform national requirements for occupying an Associate Professor position and the institutional requirements defined by the *Regulations on the Terms and Conditions for Acquiring Scientific Degrees and Occupying Academic Positions at the University "Prof. Dr Asen Zlatarov" – Burgas* unequivocally shows that all requirements have been satisfied while the group of indicators "D" it has been significantly exceeded.

In conclusion, I am pleased to note that the above analysis gives me the confidence to support the candidate T. Petkov, PhD, in this competition. The applicant undoubtedly has the necessary professional competencies to occupy the Associate Professor position in the field of higher education "5. Technical Sciences", professional field: 5.3 "Communication and Computer Technology", scientific speciality "Intelligent Control Systems".

Date: 10.01.2025

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