

STATEMENT

concerning a contest for obtaining an academic position „Associate Professor” in the scientific specialty „Application of the principles and methods of cybernetics in different fields of science (biomedicine)” in the professional field

5.2 „Electrical Engineering, Electronics and Automation”

announced in State Gazette (SG) 69/16.08.2024 for Department „Analysis and Processing of Biomedical Signals and Data”, IBPhBME - BAS

with candidate: Tatyana Dimitrova Dobreva, PhD, Eng, Assistant Professor

Member of the Scientific Jury: Peter Ivanov Yakimov, PhD, Eng, Professor

1. Overall characteristic of the applicant’s research and scientific applied activity

Assist. Prof. Eng. Tatyana Dimitrova Dobreva, PhD, presented for participation in the competition scientific publications outside the dissertation thesis for the Doctor degree as follows:

Group of indicators	Minimum number of points	Applicant’s number of points	Number of points by main indicators per group	
A	50	50	PhD Diploma № 28538 Date: 26.06.2003; Issued by: Higher Attestation Commission; Professional field 5.2 „Electrical Engineering, Electronics and Automation”; Scientific specialty: „Automated systems for information processing and control in medicine”	
B	–			
V	100	189	V3	
			V4	189
G	200	311	G5	
			G6	
			G7	163
			G8	148
			G9	
			G10	
			G11	
D	50	100	D12	100
			D13	
			D14	
			D15	
E	–	80	E26	80
Total	400	730		

A total of 38 scientific publications were presented under the competition. From them:

- 14 have SJR and/or IF - 10 in the list of indicator V4 and 4 in the list of indicator G7;
- 12 are published in international journals, distributed by quartiles: Q1 – 1, Q2 – 6, Q3 – 5;
- 8 are presented at international conferences and published in proceedings indexed in WoS and/or in Scopus;
- 14 are published in not referred journals with scientific review in the list of indicator G8;
- 4 are presented at conferences and published in not referred proceedings.

Of the attached publications, in 8 the candidate is the leading author, in 26 is on second order.

No declarations by co-authors have been submitted for the collective works of the candidate, so I accept that the participation of all co-authors in the publications is equivalent. I accept that all presented scientific publications are relevant to this contest.

The candidate has presented 10 citations, all in indexed in Scopus and/or in WoS editions. A Scopus reference shows a total of 153 citations to the applicant's works.

The ratio of the number of citations to the number of publications makes a good impression.

The candidate is authored two patents.

The presented scientific production (730 points) significantly exceeds ($\approx 183\%$) the minimum requirements (430 points) for academic position „Associate Professor“ according to the Rules of IBPhBME - BAS.

The candidate did not include in the competition materials leadership of two internal institutional projects, as well as participation in one international and two national scientific projects.

The presented scientific production gives opportunity to evaluate highly the publication activity of the candidate.

2. Main scientific and applied science contributions

The contributions in the applicant's publications can be distributed in the following research fields:

1. Investigation of circuits and devices for registration and generation biosignals presented in the publications [V4.1, V4.2, G8.1, G8.2, G8.3, V4.3, G7.1, G8.4, G7.2, E26.1].

2. Research on methods and electronic tools for adaptive filtering of electromyographic noise in ECG signals contained in publications [V4.5, G7.3, G7.4, V4.6, G7.5].

3. Investigation of methods and hardware and software tools for filtering network interference from ECG signals using comb filters contained in publications [G8.7, G8.8, G8.9, G8.10, G8.11, G8.12, G7.6], and by synchronous filtering presented in publications [V4.8, V4.9, V4.10, G7.7, G7.8, G8.13, G8.14, G8.15, G8.16, E26.2)].

Contributions that propose suppression of powerline frequency interference by frequency and phase synchronization using phase-locked circuits (PLL) and applying lock-in techniques can be classified as scientific. They are also applicable in processing of signals from another fields of technology. These contributions can be attributed to proving by new means essential new aspects of already existing scientific fields, problems, theories, hypotheses.

Contributions to research and implementation of circuits of differential and non-differential amplifiers of biosignals without a reference electrode and contributions to filtering electromyographic noise from electrocardiograms can be classified as applied science. They can be assigned to the creation of methods and devices with new qualities and parameters.

Contributions to the practical implementation of a 16-channel high-resolution ECG signal registration module and an ECG signal simulator can be assessed as applied. These can be classified as obtaining confirmatory facts.

3. Significance of the contributions to the science and practice

The declared scientific and applied science contributions prove the successful research activity of the candidate. They are implemented in the globally actual area of the Biomedical engineering. Many of the results of this activity are implemented in practice and are protected by patents and certificates.

It can be concluded that the research activities of the candidate have proven their usefulness.

I know Assist. Prof. Tatyana Dobreva from her participation at numerous national and international scientific forums and conferences. At them, she showed herself as a serious and competent scientist. As a member of Bulgarian Society of Biomedical Physics and Engineering, and of the Union of scientists in Bulgaria, Section „Biomedical Engineering“, Assist. Prof. Dobreva is recognizable in the scientific community.

I am confident that her successful activity will continue after the employment of academic position „Associate Professor“.

4. Critical remarks and recommendation

The contributions should be consolidated.

The applicant does not submit standalone publications, which can be defined as a skill for teamwork and providing career development opportunities for other co-authors.

I recommend the candidate after obtaining the academic position „Associate Professor“ to attract PhD students and lead research projects.

CONCLUSION

According to the submitted documents and the above analysis of the candidate's work, as well as in my personal opinion, I believe that Assist. Prof. Dr. Eng. Tatyana Dimitrova Dobrova has scientific, applied science and applied contributions to a sufficient extent, as well as significant academic activities. I believe that the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, as well as the Regulations to the law and that of the IBPhBME - BAS have been met.

Based on the presented scientific papers, their significance and citation, the scientific, applied science and applied contributions contained in them, participation in projects and contracts, I find it reasonable to offer **Assist. Prof. Dr. Eng. Tatyana Dimitrova Dobrova** to take the academic position of „Associate Professor“ in the professional field 5.2. „Electrical Engineering, Electronics and Automation“ in the scientific specialty „**Application of the principles and methods of cybernetics in different fields of science (biomedicine)**“.

Date: 15.11.2024
Sofia

Member of the Scientific Jury: 
/Prof. Eng. Peter Yakimov, PhD/