

## OPINION

in a competition for the academic position of "PROFESSOR" in: the field of higher education  
5.3 Communication and computer technology, scientific specialty "Theoretical foundations of  
communication technology"

**announced in the State Gazette** No. 89 / 26.10.2021

**with candidate:** Assoc. Prof. Eng. Valentina Ilieva Markova PhD from Communication Engineering and Technologies Department, Faculty of Computer Sciences and Automation, Technical University of Varna

**Member of the scientific jury:** Assoc. Prof. Eng. Milena Nikolova Mileva-Karova, PhD,

### 1. General characteristics of the research and applied research activities of the candidate

The documentation presented by the candidate Assoc. Prof. Valentina Markova is in the required volume and complies with the Law for the Development of the Academic Staff and the Regulations on the Terms and Conditions for Occupying Academic Positions at the Technical University of Varna. The documentation is clearly designed and arranged.

Assoc. Prof. Dr. Eng. Valentina Markova is the only candidate for the academic position "PROFESSOR". She graduated with a Master's degree in Telecommunications from the Technical University of Sofia. She obtained a PhD Diploma in Theoretical Foundations of Communication Engineering from the Technical University of Sofia and since 2016 she has been an Associate Professor in the Communication Engineering and Technologies Department at the Technical University of Varna.

Assoc. Prof. Valentina Markova has very good organizational skills. She is the head of the section "Communication and Computer Engineering" at the Research Institute of Technical University - Varna. She was a Chair of the Bulgarian Section of the IEEE (term 2021-2022) and Treasurer of the Bulgarian Section of the IEEE (term 2018-2019; 2019-2020) and currently she is a Chair of the CAS / SSC Chapter of the Bulgarian Section of the IEEE. She is a mentor of the student club "Sensor Networks" and co-organizer of the International Conference "BIA2019", "BIA2020" and "BIA2021".

The research and scientific-applied activity of the candidate is presented by a scientific publications reference, which the candidate has submitted according to the groups of indicators required to meet the uniform national minimum requirements for borrowing academic position "Professor".

The minimum requirements for the group of indicators of category "A" (**min. 50 points**) are met by the doctoral dissertation of the candidate (50 points in total).

The minimum requirements for the group of indicators of category "B" (**min. 100 points**) are met by presenting ten publications (180 points in total) in referenced publications indexed in SCOPUS. These publications are thematically grouped together as "New methods for detecting emotional states, cognitive load and stress" and it is equivalent to Habilitation Work.

The minimum requirements for the group of indicators of category "G" (**min. 200 points**) are met by presenting a total of 26 publications (**total 313.2 points**), respectively 21 publications in SCOPUS (total 272.5 points) and 5 publications (total 40.7 points), representing scientific publications in unrefereed journals with scientific review or in edited collective papers. These 26 publications are thematically grouped together as "New methods for collecting and processing signals".

The minimum requirements for the group of indicators of category "D" (**min. 100 points**) are met by referring to several citations categories (**310 points in total**). According to the

automated system Google Science, the candidate's publications have received 119 references, 80 after 2016. In the SCOPUS database there are 32 citations of the author's publications for the last 5 years, excluding self-citations of all authors of relevant publications.

The minimum requirements for the group of indicators of category "E" (**min. 150 points**) are met by reference to documents for all subcategories (**total 531 points**). It is impressive the very active participation of the applicant in national and international projects with a high public importance in the form of participation, project management or raising funds for projects (7 projects). A usefull model has been requested.

The minimum requirements for the group of indicators of category "J" (**min. 120 points**) are met by the lecture courses supervised by the candidate (**total 1100**).

Associate Professor Valentina Markova meets the required minimum national requirements for holding the academic position "PROFESSOR" at TU-Varna.

## **2. Evaluation of the pedagogical preparation and activity of the candidate.**

Assoc. Prof. Valentina Markova has been working at the Technical University of Varna since 2009. She actively participates in all levels of University education in the last 3 years. She has led 7 lecture courses with 195 lecture hours in the Bachelor's Degree, 2 lecture courses with 60 lecture hours in the Master's Degree. She is the supervisor of more than 30 graduate students, including two awarded the "Best Diploma Thesis". She is a reviewer of more than 20 diploma theses and she is a member of the diploma defense commission. She supervises three full-time PhD students.

The candidate's experience as a teacher in higher education, the work as a student club mentor, the manadement of specialized laboratories are the reason to emphasize that the candidate is a specialist in her professional field with high scientific, pedagogical and methodological qualifications.

## **3. Main scientific and applied contributions**

The scientific and scientifically applied contributions formulated by Assoc. Prof. Markova,

I. The first group "New methods for detecting emotional states, cognitive load and stress" includes 3 contributions as follows: 1) Development of new methods for detecting negative emotional states and stress from physiological signals (photoplethysmogram, EKG, surface galvanic resistance of the skin) or speech, presented in publications [B4.1, B4.2, B4.4, B.4.5, B4.9]; 2) Improved existing and created new methods for extracting descriptors from physiological signals presented in publications [B4.6, B4.8, B4.10]; 3) Synthesized a new intelligent architecture for highly responsible communications, which is sensitive and adaptable to the context of existing 3G / 4G / 5G networks. presented in publications [B4.3, B4.7].

The submitted utility model "Physiological condition monitoring system" is a important contribution from the first group. The "Emotional states" is a new, advanced knowledge field and the methods for their research can be considered as a means for renewing this field.

II. The second group "Created new methods for collecting and processing signals", includes 6 contributions as follows: 1) Created new methods for processing and analysis of physiological signals [G7.7; G7.15; G7.16; G.7.17; G7.18; G7.19; G7.20; G7.21; G8.1; G8.3]; 2) Created algorithms for processing and analysis of audio and speech signals [G7.1; G7.2; G7.8; G7.9, G7.10; G7.12; G.7.13]; 3) Created resources and algorithms for ergonomic evaluation of the working environment and prevention of musculoskeletal disorders [G7.4; G7.5]; 4) Created resources, study the applicability of traditional modeling methods to the propagation of radio waves over the Black Sea [G7.3; G8.2]; 5) Created resources and software to support training, research and applied activities in TU-Varna [G.7.6; G7.14, G8.5]; 6) Study of the applicability and effectiveness of innovative teaching methods for the engineering education specifics at Technical University of Varna [G7.11; G8.4].

Many contributions of Associate Professor Valentina Markova are the result of her extremely active work in 15 International and National Research Projects. Thus she has contributed to the transformation of the University as a up-to-date research center.

#### **4. Significance of contributions to science and practice**

The scientific production of the candidate is presented at authoritative scientific forums. For the last 5 years, the candidate is the author and the co-author of over 80 scientific publications in refereed publications and over 80 citations, of which 33 are in the SCOPUS database.

Associate Professor Valentina Markova has published significant results and she has won a recognition in the scientific community. Google Scholar Hirsch index h-index = 4 and Scopus Hirsch Index h-index = 4, the membership in professional organizations such as the IEEE, the membership in scientific juries for academic titles, the membership in International Organizational and Program Committees of scientific conferences are indisputable evidences for this research activity.

The result of the scientific and applied research implementation of Associate Professor Markova is expressed in the improvement and enrichment of the facilities for the engineers training at the Technical University of Varna.

#### **5. Critical remarks and recommendations**

From the review of the candidate's scientific works I have no critical notes. I have a recommendation to continue the results publishing in the indexed databases and in the scientific journals with IF.

#### **CONCLUSION**

A large number of significant scientific papers have been presented. There are enough original scientific and applied contributions in the works, which have received international recognition. Assoc. Prof. Markova is an authoritative lecturer. Based on the acquaintance with the presented scientific papers, their significance, the scientific, applied and applied contributions contained in them, I find it reasonable to propose Assoc. Prof. Dr. Eng. Valentina Ilieva Markova to take the academic position "PROFESSOR" in the professional field: 5.3 "Communication and computer technology", specialty: "Theoretical foundations of communication technology".

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Signature:

/Assos. Prof. M.Karova, PhD/