

REVIEW

in a competition for the academic position of "Professor"
in professional field 5.3 "Communication and Computer Engineering", specialty
"Theoretical Foundations of Communication Engineering",
published in SG No./89/26.10.2021,
with candidate Assoc. Prof. Dr. Eng. Valentina Ilieva Markova affiliated with the
Department of Communication Engineering and Technologies, Faculty of Computer
Sciences and Automation, Technical University of Varna
Reviewer: Prof. DSc. Math. Evelina Nikolova Pencheva

1. General information and biographical data

The only candidate in the competition is Assoc. Prof. Dr. Eng. Valentina Ilieva Markova. The candidate was born in 1980 in the town of Gotse Delchev. She graduated from the High School of Natural Sciences and Mathematics in Gotse Delchev, specialty in mathematics in 1997. In 2002, she graduated with a master's degree from the Technical University of Sofia, specialty in Telecommunications. In the same year, she became a PhD student at the Technical University – Sofia in the scientific area of "Theoretical Foundations of Communication Engineering". The topic of her dissertation was "Design and implementation of linear digital circuits without multipliers". He obtained the educational and scientific degree "Doctor" in 2008. She began her professional career in 2007 as an "Assistant" at the Technical University of Varna, Department of Communication Engineering and Technology. In 2009, she became "Assistant Professor" in the same department, and since 2016 he has held the academic position of "Associate Professor". She is fluent in English, has good communication and teamwork skills acquired during her work as a lecturer and participant in research projects. The candidate has impressive organizational skills and competencies acquired as Head of the Communication and Computer Engineering Section at the Research Institute of Technical University - Varna, Chair of the Bulgarian Section of IEEE (term 2021-2022), Chair of Chapter CAS/SSC of the Bulgarian Section of IEEE, treasurer of the Bulgarian Section of IEEE (term 2018-2019; 2019-2020), mentor of the student club "Sensor Networks" and co-organizer of the international conference "BIA2019" and "BIA2020", "BIA2021". She is also a coorganizer of two scientific and educational forums for students, organized with the participation of TU-Varna and held in Bulgaria. She is a member of professional organizations IEEE and the Federation of Scientific and Technical Unions in Bulgaria. She is a member of several editorial boards of conference proceedings, a member of organizational and program committees of international scientific conferences and expert commissions on "Technical Sciences".

The proposal for announcing the competition was made by the Department Council of the Department of Communication Engineering and Technology, with protocol №18 on

05.07.2021, which was supported by the decision of the Faculty Council of FITA with protocol №1 on 16.09.2021. The final decision for opening a competition for the academic position "Professor" was taken at a meeting of the Academic Council of TU-Varna with protocol №38 on 27.09.2021. The course in which the competition was announced is "Information systems for data collection".

All the necessary documents for participation in the competition for the academic position "Professor" are presented including application to the Rector of TU-Varna, candidate CV, diplomas for the Educational and Scientific Degree "Doctor", diploma for the academic position "Associate Professor", certificate of completion of the minimal national requirements, list of scientific papers related to the competition, description of the contributions, papers submitted for participation in the competition for "Associate Professor" and for the acquisition of the Educational and Scientific Degree "Doctor", papers for participation in the competition for "Professor" and other documents for scientific and teaching activities of the candidate. The presented set of documents in its composition is in accordance with the requirements regulated in the Act on Development of the Academic Staff in the Republic of Bulgaria and in the Regulations of TU-Varna and the regulations for its implementation. It is noteworthy that the entire documentation is very carefully prepared and contains all the necessary information for the competition about the candidate.

2. General description of the submitted materials

The candidate has submitted for review a total of 36 scientific publications for participation in the competition for the academic position "Professor". All submitted works are related to research and teaching activities in the scientific field of the competition. Documents for participation and management in 15 research projects are attached. A document for a utility application filed with the Patent Office in Bulgaria is supplied.

The minimal requirements for the group of indicators from category "A" (min. 50 points) are covered by the doctoral dissertation of the candidate.

To meet the minimal requirements for the group of indicators of category "B" (min. 100 points), the candidate presents ten publications (a total of 180 points) in referenced publications indexed in SCOPUS. These publications are thematically grouped together as "New methods for detecting emotional states, cognitive load and stress" and they are equivalent to a monograph.

The candidate submits a total of 26 publications (total 313.2 points) to meet the minimal requirements for the group of indicators of category "D" (min. 200 points), of which:

- 21 publications are referenced in SCOPUS (272.5 points in total), covering the requirements of indicator "D.7 Scientific publications in issues that are referenced and indexed in world-renowned databases with scientific information" and

- 5 publications (total 40.7 points), covering the requirements under indicator "D.8 Scientific publications in unreviewed journals with scientific review or in edited collective papers".

These 26 publications related to the group of indicators of category "D" are thematically generalized as "New methods for signal collecting and processing".

The group of indicators "E" defines several categories of citations of the author's scientific works in publications of other authors, according to the indexing of the citation publication. The SCOPUS database contains 32 citations of the candidate's publications, excluding the self-citations of all authors of the respective publications. To meet the minimal requirements for the group of indicators "E" (min. 100 points) lists of citations are attached which fall into the category "E.12 Citations or reviews in scientific journals, referenced and indexed in world-renowned databases of scientific information or in monographs and collective volumes". The list includes citations for 12 of the candidate's publications. These citations correspond to the indicator "E.12", whereby according to the criteria "E" the candidate collects a total of 310 points.

To meet the minimal requirements for a group of indicators of category "F" (min. 150 points), the candidate provides lists of points for participation in national or educational projects, participation in international projects, management of national and international projects, attracted project funds, guided by the candidate and a published patent application for a utility model, which form 531 points.

To meet the minimal requirements for a group of indicators in category "G.29" (min. 120 points) the candidate provides a copy of her individual plan for the academic years for students in Bachelor and Master degree courses and a list of disciplines. According to the indicators from group "G" the candidate has given lectures in 5 courses for about 1102 lecture hours at TU-Varna for the last 3 years.

The review of the documents showed that the content of the documents confirms that the candidate not only meets the minimal requirements defined in the law for the development of the academic staff and the regulations for its application, and exceeds them considerably.

3. General characteristics of the research and applied activities of the candidate

Thirty one publications of the all presented 36 ones, are indexed in SCOPUS and/or Web of Science and cover the requirements of indicators "C.4 Habilitation work - scientific publications (not less than 10) in issues that are referenced and indexed in world-renowned databases with scientific information", and "D.7 Scientific publication in publications that are referenced and indexed in world-renowned databases of scientific information". The five publications that are not indexed in SCOPUS are grouped by indicator "D.8 Scientific publication in unreviewed journals with scientific review or in edited collective papers".

Ten of the publications submitted for participation in the competition are scientific articles in journals, 6 of which are indexed in SCOPUS, 26 are published in conference proceedings, 25 of which are indexed in SCOPUS, 4 have an impact rank SJR.

The Hirsch index of the candidate in SCOPUS is 4.

The data presented so far about the research activity of Assoc. Prof. Dr. Valentina Markova, as well as citations of her works by other authors, testify to a very high level of recognition of her results, which undoubtedly defines her as an established scientist.

The candidate's scientific and applied activity is characterized by enviable activity and participation in research and applied projects, 5 of which are international, 2 are funded by the framework programs of the European Union, 1 is funded by the National Innovation Fund, 3 are funded by the Bulgarian National Science Fund and the rest 6 are funded by TU-Varna. The candidate is a coordinator and researcher of 3 projects, a leader and researcher in 12 projects, and she participates as a researcher in the other projects. These data give grounds for an excellent assessment of the scientific and applied candidate's activity.

4. Assessment of the pedagogical preparation and activity of the candidate

The pedagogical activity of Assoc. Prof. Valentina Markova is very diverse and intensive. She has been leading lecture courses in 7 courses, included in the curriculum of the bachelor's degree and lecture courses in 2 courses, included in the curriculum of the Master's degree for the last three years. She is a supervisor of three doctoral students, one of whom has been taken out with the right to defend. The candidate is a leader of more than 30 graduate students, including two, awarded with the prize of the Municipality of Varna "Best Diploma Thesis", respectively on the first and second place.

This activity determines her as an excellently prepared teacher with the desire and capacity to develop new and attractive lecture courses for students, which is of great importance for the dynamically changing communication and information technologies.

5. Main scientific and applied contributions

The candidate's research is interdisciplinary and it focuses on both modern communication technologies and the use of information technology in medicine.

The main contributions of the publications in the group of indicators of category "B.4", which correspond to a monograph, include the following:

- new methods for detecting negative emotional states and stress from physiological signals (photoplethysmogram, ECG, surface galvanic resistance of the skin) or speech;
- improved existing and new methods for extracting descriptors from physiological signals;
- a new intelligent architecture for mission critical communications that is sensitive and adaptable to the context of available 3G/4G/5G networks.

These contributions are scientific and applied in nature, related to the creation of new methods in the field of information and communication technologies in medicine. The results of the research have been published in a total of 10 papers, all of which are indexed in SCOPUS and/or the Web of Science, two of which are in journals with SJR.

The main contributions of the publications in the group of indicators of category "D",

presented in issues that are referenced and indexed in world-renowned databases of scientific information, and those in non-referenced publications with scientific review or edited collective works, include the following:

- new methods for processing and analysis of physiological signals;
- new algorithms for processing and analysis of audio and speech signals;
- new resources and algorithms for ergonomic assessment of the working environment and prevention of musculoskeletal disorders;
- new resources and a study on the applicability of traditional modeling methods to the propagation of radio waves over the Black Sea;
- new resources and software to support training, research and applied activities at the Technical University of Varna;
- assessment of the applicability and effectiveness of innovative training methods for the specifics of engineering education at TU-Varna.

These contributions are scientifically applied and applied in nature. The results of the research have been published in a total of 26 papers, of which 21 have been indexed in SCOPUS and/or the Web of Science, 4 of which are in journals with SJR. A patent application for a utility model related to the research in this group was made.

Two of the publications presented in the group of indicators "B.4" have one citation. One of the publications presented in the indicator group "D", has 10 citations, three of the publications have 2 citations, four of the publications have 1 citation.

There is one publication with 6 citations and 1 publication with 3 citations in the group of publications in the indicator group "A".

6. Significance of the contributions to the science and practice

The candidate's research in the field of the use of ITC technologies in medicine is related to the influence of the environment on the emotional and physical state of a person. The topic is very relevant in our time of hard work and lifestyle, and a pandemic, where social and medical problems related to stress and strain are increasing worldwide and affect mental health and well-being. The candidate uses for the research modern methods related to artificial intelligence, as well as enviable knowledge of physiological processes that can be measured by portable sensors. The candidate's research in the field of communication technologies covers important aspects of modern communications, related to new services for computing at the end of the mobile network, smart home and improving the performance of communication channels.

The indexing of publications in the world-renowned databases of SCOPUS and Web of Science, as well as the large number of citations, testify to a very high level of international recognition of research results.

The results achieved in these two areas of knowledge show a very broad horizon, multifaceted interests and in-depth knowledge of the candidate.

7. Critical remarks and recommendations

I have no general and formal remarks on the scientific works of the candidate, which have been prepared and applied according to recognized standards in the scientific community.

Assoc. Prof. Markova works intensively with PhD students and students, stimulating their interest in science and motivating them to deepen their knowledge, generate and develop innovative ideas. I recommend the candidate to attract young scientists also in her work, with whom she will work on research tasks.

8. Personal impressions and opinion of the reviewer

I know the candidate from the time when she was a doctoral student at the Technical University - Sofia. My impressions are of a gifted and creative young scientist who has a huge capacity for research and innovation. Assoc. Prof. Markova's participation in many national and international projects in recent years, as well as her multifaceted organizational and administrative activities, testify to her talent, intelligence and diligence in creating value-added scientific products in accordance with the best international standards and practice. Her scientific output has an impressive volume and quality and presents her as a precise and analytical researcher. Undoubtedly, Assoc. Prof. Markova has all the qualities and achievements to hold the academic position of "Professor".

CONCLUSION

Social and medical problems related to tension and stress are on the rise worldwide and seriously affect mental health and well-being, and their timely detection and reliable communication are essential to mitigate their effects. The candidate's research activities focus on developing methods and solutions for assessing cognitive processes such as attention, emotion and decision making, and improving the performance of communications. The results of the research contribute to the acquisition of new knowledge, the use of which can increase the effectiveness of detecting stressful situations and improve communication between the wearable sensors and centralized decision-making logic. There are enough scientific and applied contributions.

After a thorough review of the documents submitted to reviewing and assessment of the significance of the contributions in the works of the candidate, I declare my positive assessment that all requirements prescribed in the Act on Development of the Academic Staff in the Republic of Bulgaria and in the Regulations of TU-Varna are met. This gives me the right to claim that Assoc. Prof. Dr. Eng. Valentina Ilieva Markova is worthy to hold the academic position of "Professor" in professional field 5.3 "Communication and Computer Engineering".

Заличена информация
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Reviewer: Prof. DSc. Evelina Pencheva