

Review

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Concerning scientific works submitted for participation in competition for awarding the academic position of "Associate Professor" in the field of higher education 5. Technical Sciences, professional field 5.3. Communication and Computer Engineering,

Candidate: Ch. Assist. Prof.: Neli Ananieva Arabadjieva- Kalcheva, PhD

I. General and biographical data

The only candidate in the competition is assistant Professor Neli Ananieva Arabadzheva - Kalcheva. In 1990 Dr. Kalcheva graduated from the Technical University - Varna. In the period 2001 - 2004 is a full-time PhD student in the Department of Computer Systems and Technologies. It is awarded the right of defense with the topic of a dissertation work "Computer interpretation of algorithms for optimal singular adaptive monitoring". In 2014 completed a second master's degree at "Konstantin Preslavski" University of Shumen, "Pedagogy of Mathematics and Informatics Education". In 2020 obtained an educational and scientific degree "Doctor" at the Technical University-Varna, Professional field: 5.3 "Communication and computer technology", Doctoral program "Automated information processing systems".

Dr. Kalcheva began her professional career in 1998. as an informatics teacher at the Technical School of Shipbuilding and Navigation - Varna, and in the following academic year continues at the Professional High School of Textiles and Fashion Design, Varna. In the period of 2003 - 2007 Dr. Kalcheva is a teacher of informatics and information technologies at "Dimcho Debelyanov" Secondary School, Varna.

For different time intervals from September 2018 to February 2021, Dr. Neli Kalcheva held the position of "Director" and "Deputy director" of the Private Vocational High School for Engineering, Technology and Computer Sciences at the Technical University of Varna, currently Vocational High School for Computer Modeling and Computer Systems.

Over the years (from 1998 to 2004 and from 09.2011 to 11.2014) in parallel, the candidate taught as an assistant at TU-Varna in various disciplines - informatics, WEB applications, Basic programming, Risk management, Synthesis and analysis of algorithms, scripting languages. Then from November 2014 until November 2018 was appointed as a full-time assistant in the "SIT" department, TU-Varna. From March 2021 until now, Dr. Kalcheva holds the position of "Chief Assistant" in the "SIT" department, TU-Varna.

A proposal to announce the competition was taken at the Department Council of the Department of "Software and Internet Technologies" and supported at a meeting of the

Faculty Council of FITA with protocol No. 19 on 18.03.2022. The decision to announce a competition for the academic position "Associate Professor" was taken at a meeting of the Academic Council of TU-Varna on 28.03.2021. The academic discipline for which the competition was announced is "Synthesis and Analysis of Algorithms".

To participate in the competition for the academic degree "Associate Professor", all the necessary documents must be submitted, including an application to the rector of TU-Varna, a curriculum vitae, diplomas for the acquired ONS "Doctor", an employment contract for the application of JSC "principal assistant", a reference for the fulfillment of the minimum national requirements, list of candidates for participation in the competition for scientific works, description of contributions, list of publications submitted for the acquisition of the educational and scientific degree "doctor", list of publications for participation in this competition, list of scientific works, used according to the previous procedure, for occupying academic positions - "Ch. Assistant" and other documents related to the candidate's scientific and teaching activities. The presented set of documents in its composition is in accordance with the requirements that are regulated in Art. 19 of PUZAD of TU-Varna.

2. General description of the presented materials

The candidate submitted a total of 26 scientific publications for review. All submitted works are related to research and teaching activities in the scientific field of the competition and are accepted for review.

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

To meet the minimum requirements for a group of indicators of category "B" (min. 100 points), the candidate presents eleven publications (a total of 295 points) in refereed publications indexed in SCOPUS and WebofScience. These publications are thematically grouped as "Mathematical methods and algorithms, used in engineering sciences' and are equivalent to a habilitation thesis.

To meet the minimum requirements for a group of indicators from category "D" (minimum 200 points), the candidate presents a total of 15 publications (total 222.3 points), of which:

- 3 publications (a total of 53.33.5 points) are in indexed publications meeting the requirements of the indicator "D.7 Scientific publications in publications that are referenced and indexed in world-renowned databases with scientific information" and
- 12 publications (total 169 points), meeting the requirements under indicator "D.8 Scientific publications in non-refereed journals with the scientific review or in edited collective works".

To cover the minimum requirements under indicator group "D" (minimum 50 points) with attached lists of citations (total 120 points) falling into the category "D.12 Citations or reviews in scientific publications, referenced and indexed in world-renowned databases of scientific information or in monographs and collective volumes" and 'E.14 Citations or reviews in non-refereed peer-reviewed journals'.

In order to meet the minimum requirements for group indicators of category "G" (minimum 30 points), the candidate provides a copy of his individual plan for three academic years for studying the students in "Bachelor", and "Master" degrees and a list

of taught disciplines. According to this indicator, the candidate has led lectures in 3 disciplines and has conducted 234 hours of lectures at TU-Varna for the last 3 years.

In conclusion, the candidate fulfills the requirements of Art. 18 of PUZAD of TU-Varna, and for some of the indicators it significantly exceeds national minimum requirements.

3. General characteristics of the candidate's research and scientific-applied activity.

Of the 26 publications presented, 14 are indexed in SCOPUS and/or Web of Science and meet the requirements of indicators "B.4 Habilitation work - scientific publications (not less than 10) in publications 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 with scientific information". Twelve publications that are not indexed in SCOPUS are grouped under the indicator "D.8 Scientific publication in non-refereed peer-reviewed journals or in edited collective works".

The candidate's SCOPUS Hirsch index is 2.

The data presented so far about the scientific research activity of Dr. Neli Kalcheva, as well as the citations of her works by other authors, testify to a high level of recognition of her scientific research results.

The scientific applied activity of the candidate is characterized by participation in 5 research projects at TU-Varna. Dr. Kalcheva is the leader of one of the projects and participates as a researcher in the others.

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

The pedagogical activity of Dr. Neli Kalcheva is extremely diverse and intense. The candidate has the extensive pedagogical experience, and accumulated over 20 years of diligent work with pupils and students. In the last three years, Dr. Kalcheva has led lectures in 3 disciplines, there are 11 successfully defended diplomas from KST and SIT specialties.

Dr. Kalcheva has made a significant contribution to preparing students for participation in programming Olympiads. She is the leader of 24 programming teams that participate in the annual Republican Student Programming Olympiads.

Dr. Kalcheva is the organizer of three university student programming competitions at TU-Varna, one national online programming competition for students, and an online university student programming Olympiad.

5. Basic scientific and scientific-applied contributions.

The scientific research of the candidate can be summarized in three directions:

1. Mathematical methods and algorithms used in engineering sciences
2. New models of teaching by applying scientific approaches in training students from technical universities
- 3 Synthesis and analysis of methods and algorithms used in computer science

The contributions of the presented scientific works have a scientific-applied or applied nature.

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

- A proposed methodology for evaluating the applicability of algorithms for finding the shortest path in a maze
- A proposed methodology for the validation of a program code for the calculation of scattered X-rays reaching the operator's eyes during interventional procedures based on Monte Carlo techniques
- Proposed mathematical approach to obtain realistic climatic data for the temperature distribution in the gradation
- Proposed new models for teaching mathematical methods and algorithms for students from technical universities
- Comparative analysis of the accuracy and speed of various methods and algorithms for the classification of texts in Bulgarian and English
- Comparative analysis of the accuracy, precision, sensitivity, and F-measure of 7 machine learning algorithms in classifying authors of English works and classifying authors of the same works translated into Bulgarian.

The main contributions in the publications of a group of indicators of category "D", presented in publications that are referenced and indexed in world-renowned databases of scientific information, and those in non-refereed publications with peer review or in edited collective works, can be summarized as:

- Performed a comparative analysis of popular methods and algorithms for machine learning.
- Applied risk management methods on cases related to computer security.
- Analyzed algorithms for building the tree structure Trie and its variety Integer trie.

6. Significance of the contributions to science and practice.

The candidate's research is up-to-date, connected on the one hand with modern approaches to learning, and on the other with synthesis and analysis of methods and algorithms used in computer science. The results achieved show multifaceted interests and deep knowledge in the field of competition.

The indexing of a significant part of the publications (about 60%) in globally recognized databases such as SCOPUS and Web of Science, as well as the presence of citations by various authors, testify to the importance of the contributions and international recognition of the research results.

The results of the scientific research carried out are presented in publications in 10 magazines and in 16 reports presented at established international conferences in Bulgaria and abroad.

7. Critical notes and recommendations.

I have no objections to the candidate's scientific works, which are prepared and formatted according to the requirements and standards established in the scientific field.

I recommend Dr. Kalcheva, who works very successfully with students to attract doctoral students to her team, helping them deepen their knowledge and together solve research tasks and publish in journals with an impact factor.

8. Personal impressions and position of the review.

I have no direct impressions of the work of dr. Kalcheva, but I am impressed by the results she achieves with the students in the programming teams. They are proof of hard work and trust on the part of the students.

Conclusion

On the basis of familiarization with the presented scientific works, having significance, scientific, scientific-applied, and applied contributions contained in them, I state the positive assessment that all the requirements prescribed in the regulations of TU-Varna have been met. This gives me the reason to suggest the Assistant Neli Ananieva Arabadzhieva - Kalcheva to occupy the academic position of "Docent" in the professional direction 5.3 "Communication and computer technology", study discipline "Synthesis and analysis of algorithms".

Data: 25.08.2022г.

Reviewer:

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 /prof. V. Markova/