OPINION

by Assoc. Prof. Yassen Vladimirov Gorbounov, PhD

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professional field 5.2 Electrical engineering, electronics and automation

on the scientific works presented for participation in the competition for the

academic position "Associate Professor" in the field of higher education 4. Natural sciences, mathematics and informatics, professional field 4.6 Informatics and computer sciences

for the needs of the department of Informatics at the New Bulgarian University (NBU)

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Only one candidate took part in the competition for the academic position "Associate Professor", Chief Assist. Prof. Dr. Stoyan Raykov Mishev from Department of Informatics of NBU.

The opinion was prepared on the basis of order No 3-RK-193/08.04.2023 of the Rector of the NBU and a meeting of the Scientific Jury from 06.05.2023.

I. Assessment of compliance with the minimum national requirements and the requirements of the New Bulgarian University

The attached set of documents include a reference-self-assessment for the fulfillment of the minimum requirements under Art. 2b, para. 2 and 3 of ZRASRB, the Ordinance for the Development of the Academic Staff in the Republic of Bulgaria (groups A to E) and, accordingly, the requirements of the NBU (groups Ж, З, И). The correspondence to cover the minimum required points by groups of indicators for the academic position "Associate Professor" is given in the following table:

Group of indicators	А	Б	В	Г	Д	Е	Ж	З	И
Minimum points	50	0	100	200	50	0	50	70	50
Fulfillment of points	50	0	135	357	264	0	80	110	75

According to the presented author's reference, the candidate participates in the competition with 3 publications, referenced and indexed in the Web of Science and Scopus databases, which cover indicator Б.4 (habilitation thesis) and represent 135% of the required minimum. According to indicator Д.7, 8 publications indexed in Scopus are presented, of which 6 are in Web of Science, and

all of them have SJR index, and 5 of them are with IF, which covers 178.5% of the required. According to indicator Д.11, 34 citations in refereed journals are presented, of which 31 are cited in Web of Science publications, giving 528% of the minimum. All publications and citations submitted for participation in the competition are in English and have not been used to acquire the PhD degree. Quantitative compliance assessment shows significant over-fulfilment of regulatory requirements.

II. Research activity and results

The research and scientific activity of the candidate Chief Assist. Prof. Dr. Stoyan Mishev concern the fields of theoretical and mathematical physics, machine learning and high-performance computing, which strongly correlate with the field of the announced competition.

In the field of physics, the solution of the many-body problem in quantum mechanics and its applications to various physical systems are addressed, as well as the method of bound clusters and obtaining results for infinite nuclear matter at high densities important for neutron stars. Although related to physics, this field of science implies the use of a serious mathematical apparatus, which is evident in a large part of the submitted publications for the competition. Undoubtedly, such in-depth knowledge is a serious certificate for the candidate's qualities in the scientific field.

In the field of machine learning Chief Assist. Prof. Dr. Stoyan Mishev, examines and applies symmetric approaches, giving constraints on the transformations between layers of artificial neural networks with forward propagation. The candidate carries out active research in the field of equivariant and invariant transformations between layers in graph neural networks, as this scientific direction is relatively new and highly relevant worldwide. In addition, Dr. Stoyan Mishev applies machine learning algorithms in the field of quantum computers, which also covers part of the disciplines he leads.

A reference to Dr. Mishev in the Web of Science database shows a total of 13 publications, 44 citations and an h-index of 4, and in the Scopus database a total of 16 publications, 55 citations from 47 sources and an h-index of 5 are registered. The total number of publications in these databases and the large number of citations speak enough for the reflection of his research activity in the scientific literature and its evaluation by the scientific community. In a number of publications, not only scientific-applied, but also scientific contribution is evident. Dr. Mishev takes part in a number of international and national scientific research projects, and to some of them he has also attracted students from the New Bulgarian University.

III. Learning and teaching activity

The educational and teaching activities of Chief Assist. Prof. Dr. Stoyan Mishev is mainly in the field of professional field 4.6. Informatics and Computer Science, and includes undergraduate and graduate courses in Big Data Processing, Programming and Object Oriented Programming (C++), Prediction through Data Analytics, Neural Networks, Software Architectures for Machine Learning, Quantum Computing, Systems and Algorithms for autonomous driving, etc. The total number of courses distributed in the years since 2017 amounts to 27 unique signatures, of which 11 (40%) are

at the Master's level. In 2022/2023, Dr. Mishev is a leading lecturer in an author's course on Quantum Computing with a total volume of 34 lectures held at Sofia Tech Park. I have attended some of these lectures and can confirm their high scientific level. Students are regularly invited as listeners, some of whom are current students or have subsequently been attracted as students to the Master's Programme "Knowledge Extraction and Technologies for Big Data" at the NBU.

The average rating from student surveys is 4.46 (out of a maximum of 5). The pedagogical activity of the candidate Chief Assist. Prof. Dr. Stoyan Mishev is completely oriented in the field of the competition, which makes him suitable for occupying the academic position of "Associate Professor".

IV. Administrative and public activity

The candidate Chief Assist. Prof. Dr. Stoyan Mishev is a member of the Union of Mathematicians in Bulgaria, the Union of Physicists in Bulgaria and the Union of Automation and Informatics at the Federation of Scientific and Technical Unions in Bulgaria. He holds the post of Chairman of the Management Board of the "Institute for Modern Physical Research". He is the author and an active participant in the development of the Master's Programme "Knowledge Extraction and Technologies for Big Data" at New Bulgarian University. In the period from December 2018 to July 2021, he organized four schools of astrophysics and astronomy with the participation of NBU students (three at NAO Rozhen and one at AO Yuri Gagarin, Stara Zagora). He has repeatedly supported the participation of NBU students in schools, practices and scientific visits to CERN, JINR-Dubna, Russia, University of Tübingen, Germany, as well as participation of NBU students with scientific reports at international scientific forums, the last one being the international forum "First workshop on Soliton Theory, Nonlinear Dynamics and Machine Learning", in the period August 12-17, 2023 in the city of Varna.

V. Personal impressions of the candidate (if any)

I am familiar with the work and the direction of the candidate's research activities Chief Assist. Prof. Dr. Stoyan Mishev since 2019 as my colleague at New Bulgarian University. My personal impressions are of an initiative and motivated colleague with a vision for development and an approach to science and education. I believe that Dr. Stoyan Mishev has extensive research experience and a high level of competence in the field of the competition.

VI. Opinions, recommendations and notes on the activity and achievements of the candidate

I have no critical remarks on the candidate's work. I recommend that he continue and deepen his teaching and research work in professional field 4.6. Informatics and Computer Science.

CONCLUSION

After having familiarized myself with the materials provided for the competition, the scientific publications, as well as the contributions in them, I confirm with conviction that the candidate fully meets the requirements of ZRASRB, the rules to it and the Ordinance on the development of the academic staff of the NBU for occupying the academic position " Associate Professor" in the field of higher education 4. Natural sciences, mathematics and informatics, professional field 4.6 Informatics and computer sciences. The candidate satisfies the minimum national requirements in the professional direction, as no traces of plagiarism can be seen in the scientific works submitted for the competition.

I express my positive assessment of the candidacy of Chief Assist. Prof. Dr. Stoyan Mishev.

Based on the above, I recommend the respected Scientific Jury to propose to the Academic Council of the NBU to elect Chief Assist. Prof. Dr. Stoyan Mishev for taking the academic position "Associate Professor" in the professional field 4.6 Informatics and computer sciences.

03.07.2023   Signature …………………………….

/ Assoc. Prof. Yassen Vladimirov Gorbounov, PhD /