

## REVIEW

of the submitted works for participation in a competition for the academic position of ASSOCIATE PROFESSOR in the professional field 4.6 "Informatics and Computer Science", scientific specialty "Informatics" announced by the Institute of Biophysics and Biomedical Engineering at the Bulgarian Academy of Sciences, in SG, No 26/01.04.2022

**Reviewer:** Prof. DSc. Daniela Ivanova Borissova

**Candidate:** Chief Assistant Dr. Simeon Alexandrov Ribagin

According to the order of Order No 319/02.06.2022 of the Director of the Institute of Biophysics and Biomedical Engineering (IBFBMI) at BAS I have been appointed to be a member of the scientific jury under the announced procedure and according to the minutes of the first meeting on 06.06.2022 I have been appointed to prepare a review. For this purpose, I received all the documents submitted by the applicant for the procedure.

### I. BRIEF BIOGRAPHICAL DATA OF THE CANDIDATE

Ch. Assistant Professor Dr. Simeon Ribagin was born on December 30, 1981. He graduated with a master's degree from the National Sports Academy "Vasil Levski" with a degree in "Kinesitherapy" in 2010, and in 2015 he received an educational and scientific degree "Doctor" in professional field "Informatics and Computer Science", specialty "Application of the principles and methods of cybernetics" at IBFBMI at BAS. Since 2015 he has been a chief assistant in the section "Bioinformatics and Mathematical Modeling" at IBFBMI – BAS, and since 2018 he has been elected associate professor at the Medical College at the University "Prof. Dr. As. Zlatarov" Burgas.

### II. ASSESSMENT FOR COMPLIANCE WITH THE MINIMUM NATIONAL REQUIREMENTS AND THE REQUIREMENTS OF IBFBMI-BAS

According to Art. 57a of the Regulations for implementation of the Law on the Development of Academic Staff in the Republic of Bulgaria (respectively Article 24 of the Law on the Development of Academic Staff in the Republic of

Bulgaria (LDASRB) and in accordance with the Rules for its implementation), the members of the scientific jury shall evaluate the candidates for holding the academic position “Associate Professor” according to the fulfillment of the conditions under Art. 53 and in accordance with the results of the inquiries under Art. 54, para. 1 of the Regulations for application of LDASRB. The fulfillment of these conditions is shown in the following table:

<b>Applicants for the academic position of “Associate Professor” must meet the following conditions:</b>	<b>Presented documents</b>
Art. 53, para. 1. to have acquired an educational and scientific degree “Doctor”	Diploma for educational and scientific degree “Doctor” No 620 of October 5, 2015 from IBFBMI-BAS
Art. 53, para. 2. not less than two years: a) have held the academic position of “assistant”, “chief assistant”, or .....	Official note for work experience from IBFBMI-BAS
Art. 53, para. 3. to have submitted a published monographic work or equivalent publications in specialized scientific publications or evidence of relevant artistic achievements in the field of arts, which do not repeat the submitted for the acquisition of educational and scientific degree “Doctor” and for the acquisition of a scientific degree “Doctor of Sciences”.	Information on fulfillment of the minimum national and specific requirements
Art. 53, para 4. to meet the relevant minimum national requirements and the requirements of Art. 1a, para. 2	Information on the implementation of the minimum national requirements and the specific requirements of IBFBMI-BAS
Art. 53, para 5. not to have legally proven plagiarism in scientific works.	---
Art. 54, para. 1. The candidates shall submit a reference for fulfillment of the minimum national requirements and of the requirements under art. 1a, para. 2, as well as a reference for the original scientific contributions, to which the respective evidences are attached.	Information on the implementation of the minimum national and specific requirements and the extended habilitation report on the scientific contributions



From the submitted scientific works for participation in the competition, the fulfillment of Art. 53, para. 5.

The implementation of the minimum points in the groups of indicators for the academic position “Associate Professor”, according to the specific requirements of IBFBMI at BAS, is as follows:

Area 4. Natural sciences, mathematics and informatics,  
Professional field 4.6. Informatics and computer science

Group of indicators	Contents	Associate Professor (min. points)	Presented by the candidate in the competition
<b>A</b>	Indicator 1	50	<b>50</b>
<b>B</b>	Indicator 2	---	---
<b>C</b>	Indicator 3 or 4	100	<b>100</b>
<b>D</b>	Sum of indicators from 5 to 10	220	<b>234</b>
<b>E</b>	Indicator 11	60	<b>72</b>
<b>F</b>	Sum of indicators from 12 to the end	---	---

For group C – the candidate submitted information for 6 publications, **5 of which are in journals with impact factor and one in SJR**. A total of 23 publications have been presented for Group D, **3 of which are in journals with impact factor**. For the citations concerning group E, the candidate submitted a reference for 1 publication, cited 12 times, which met the minimum requirements. In addition, the applicant submitted a reference from the Sonix system, which shows that his publications have been cited a total of 151 times. It is important to note that there is also the fulfillment of the specific requirements of IBFBMI-BAS, namely – the presence of 8 publications in journals with impact factor, distributed between criteria C4 and D7.

From the analysis made in this way it is easy to establish that the candidate fully satisfies both the minimum national requirements and the specific requirements of IBFBMI-BAS.

The reference from the databases in Scopus and Web of Science shows the following scientometric indicators for the candidate:

	Scopus	Web of Science
h-index	5	4
Author's documents	32	19
Citations	81	51

### **III. MAIN CONTRIBUTIONS IN THE SCIENTIFIC AND SCIENTIFIC-APPLIED ACTIVITY OF THE CANDIDATE**

From the presented 29 publications, it can be summarized that Dr. Ribagin's research interests are related to modeling of biological processes and physiology of the human body; application of the Generalized Networks (GN) in the field of medicine and medical rehabilitation; development of algorithms described by GN for diagnosis and rehabilitation of various pathologies; new approaches in decision-making in the functional diagnostics of the musculoskeletal system (MSS); intuition fuzzy sets (IFS); application of intercriteria analysis (ICA); as well as in the field of processing and analysis of electromyographic signals. The main contributions to the publications of Ch. Assistant Dr. Simeon Ribagin can be systematized in the following main areas:

1. Scientific results in the theory of GN and IFS in order to better theoretical understanding and their practical application in medical and biological sciences,
2. Application of GN and the theory of IFS in the field of medicine, rehabilitation, orthopedic and traumatological diagnostics,
3. Application of new approaches in decision making and application of ICA in medicine, kinesitherapy and industry.
4. Investigation of electromyographic potentials in norm and pathology.



In the field of GN and IFS theory, a family of new modal operators has been defined and their properties have been studied. A new intuitionally fuzzy implication has been defined and its properties have been studied. The theory of ICA has been extended to include new possibilities for aggregation based on what is called “full relevance”. This allows better discovery of knowledge and selection of the most influential entrance.

In the field of GN and ICA application, a new intuitionist fuzzy approach has been proposed to assess the functional state of the peripheral joints; GN models for decision-making in determining the functional state of MSS have been formulated, as well as GM models for decision-making in treatment and preparation of a diagnostic plan in medicine, rehabilitation, orthopedics and traumatology.

In the field of the third direction (application of new approaches in decision-making and application of ICA) ICA was used to assess the functional status of patients with Bechterew’s disease; ICA was used to search for dependencies in data from transfusion hematology centers in Bulgaria; ICA and artificial neural networks have been implemented in order to support solutions related to tasks in the oil industry.

In the field of the fourth direction (study of electromyographic potentials in norm and pathology) an experimental setup was developed in order to study muscle activity through superficial electromyography in healthy subjects and in patients who have had a cerebrovascular accident; statistical analysis of experimental data obtained from electromyographic studies was performed in order to detect differences in muscle response and activity in normal and pathology.

It can be summarized that the formulated contributions were made personally by the candidate. The reason for this statement is the fact that in 10 of the publications submitted in the competition, he is the first author, and for the rest he is the second, third or next author.

#### **IV. CRITICAL NOTES AND RECOMMENDATIONS**

I have no critical remarks to the candidate Ch. Assistant Dr. Simeon Alexandrov Ribagin. I believe that the documents have been prepared with the necessary precision.

## V. CONCLUSION

Taking into account the fulfillment of all normative requirements, according to Law on the Development of Academic Staff in the Republic of Bulgaria, the regulations for its application, as well as the regulations for the conditions and procedure for acquiring scientific degrees and for holding academic positions at the Institute of Biophysics and Biomedical Engineering at BAS, incl. the reports on the fulfillment of the minimum national requirements, the scientometric indicators from Scopus and Web of Science, it was established that the candidate fully satisfies the requirements for holding the academic position in the announced competition. **All this gives me sufficient grounds to give a categorically positive assessment and I propose that the scientific jury vote on a proposal to the Scientific Council of the Institute of Biophysics and Biomedical Engineering at BAS to elect Ch. Assistant Dr. Simeon Alexandrov Ribagin for the academic position of “Associate Professor” in the professional field 4.6 “Informatics and Computer Science”.**

Date: 07.07.2022

Reviewer: ...  .....

Prof. DSc. Daniela Borissova