

## OPINION

By Prof. Tania Koleva Pencheva, PhD

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For the concourse for promotion to the academic position **"Associate Professor"**,  
announced in **State Gazette, issue 26 from 01.04.2022**

Higher Education Area: **4. Natural Sciences, Mathematics and Informatics**

Professional Field: **4.6. Informatics and Computer Sciences**

Scientific Specialty: **Informatics**

Candidate: **Senior Assist. Prof. Simeon Aleksandrov Ribagin, PhD**

### Review of the presented materials

With Ordinance No. 294/27.05.2022 of the Director of the Institute of Biophysics and Biomedical Engineering – Bulgarian Academy of Sciences (IBPhBME – BAS), I have been appointed as a member of the Scientific Jury of a concourse for the academic position **"Associate Professor"** where the only candidate is **Senior Assist. Prof. Simeon Aleksandrov Ribagin, PhD**.

As a member of the Scientific Jury, I have received:

1. Documents regarding the candidate's participation in the concourse.
2. Copies of the publications, presented for participation in the concourse.

In the presented form, the documents of Senior Assist. Prof. Simeon Ribagin are in full compliance with the requirements stipulated in the Act on Development of the Academic Staff in the Republic of Bulgaria (ADASRB), as well as the Regulations for its applications approved by the Council of Ministers, BAS, and IBPhBME – BAS.

### Short biographic notes

Simeon Ribagin graduated as M.Sc. of Kinesitherapy with a specialty "Kinesitherapy in Orthopaedics and Traumatology" at the National Sports Academy "Vasil Levski" – Sofia in 2010. He began his scientific career as a PhD student at IBPhBME – BAS (2010-2013 according to "1\_CV", and 2011-2013 according to "8\_Habilitation Extended Reference for Scientific Contributions") in the scientific specialty "Application of the Principles and Methods of Cybernetics" in the "Bioinformatics and Mathematical Modelling" Department. In 2015, he defended a PhD thesis on the topic "Generalized Net Models of the Skeletal and Neuromuscular Systems of the Upper Limb". Simeon Ribagin was elected to the academic position of Senior Assistant Professor in the "Bioinformatics and Mathematical Modelling" Department at IBPhBME – BAS (in 2015 according to "1\_CV" and in 2016 according to "8\_Habilitation Extended Reference for Scientific Contributions"), and in 2018 – to the academic position of Associate Professor in the College of Medicine at the University "Prof. Dr. Asen Zlatarov" – Burgas, where since 2021 he has also been the head of the "Health and Pharmaceutical Care" Department. Despite the reported inconsistencies between the two documents, Simeon Ribagin meets the requirements of item 5.3 of the Regulations of IBPhBME – BAS for the implementation of ADASRB. The scientific interests of Simeon Ribagin are in the fields of modelling of biological processes and human body physiology, diagnostics and rehabilitation in various pathologies, functional diagnostics of the musculoskeletal system and processing and analysis of electromyographic signals through the application of advanced informatics approaches, including artificial intelligence, such as intuitionistic fuzzy sets (IFS), generalized nets (GN), artificial neural networks (ANN), and intercriteria analysis (ICrA).

### Publication and lecturing activities, project participation

For participation in the concourse for promotion to the academic position **"Associate Professor"**, Simeon Ribagin has presented **29 scientific publications**, of which **8 papers in journals with an impact factor**, **17 papers in journals with an SJR**, and **3 papers in international journals without an impact factor or an SJR**. Simeon Ribagin has presented for the concourse **1 book chapter** which is referred in Scopus and is also with an **SJR**, which makes the number of publications with an **SJR a total of 18**. In documents "3\_Detailed Reference" and "4\_List of Scientific Publications" the number of articles with an SJR is 14, and



the SJR of 4 more publications, with numbers from 15 to 18 in "*4\_List of Scientific Publications*" is not reported. I would like also to point out the fact that 2 of the 29 publications presented for the concourse are written by the author alone, and in 8 (11 according to "*8\_Habilitation Extended Reference for Scientific Contributions*") of the collective works, Simeon Ribagin is the first author. This fact irrefutably shows the **personal input of the candidate** in his research developments. I recognize all publications by Simeon Ribagin, which have been presented for the concourse, as fully compliant with the requirements for proven excellence of the scientific publications, as well as strictly relevant to the thematic scope of the concourse. As a critical note, I would mention the different order of the publications used in the different documents.

In "*3\_DetailedReference*" Simeon Ribagin's publications are presented as follows: according to indicator B4 – 6 publications, including **5 with an impact factor** and **1 with an SJR**, and according to indicator G7 – 22 publications, including **3 with an impact factor**, **16 with an SJR** and **3 without an impact factor or an SJR**. According to indicator G8, **1 book chapter with an SJR** is presented. A list of **12 citations** of only 1 publication is presented, but according to Scopus Simeon Ribagin has 84 citations (excluding self-citations) on 32 publications, with an **h-index of 6** (excluding self-citations). As part of the evidence presented, the candidate has submitted a list of a total of 151 citations of 33 scientific publications.

Simeon Ribagin has personally presented scientific results of conducted research at **10 international** and **3 national forums**. A reference is also presented for participation in **1 international project**, as well as for **2 projects for young researchers, in which Simeon Ribagin was the principal investigator**. For one of the projects, Simeon Ribagin was granted an award for the most successful project.

Since 2010, Simeon Ribagin has been a part-time lecturer in Physical Therapy at the University of National and World Economy – Sofia, and since 2018 – as mentioned above, he has been an Associate Professor at the University "Prof. Dr. A. Zlatarov" – Burgas. I firmly believe that Simeon Ribagin has the potential to be a scientific advisor of graduates and PhD students.

All of the above presents the candidate in the concourse for promotion to the academic position "Associate Professor" Simeon Ribagin as a fully competent specialist in the area of application of artificial intelligence methods for the purposes of diagnosis and rehabilitation in various pathologies, functional diagnosis of the musculoskeletal system, as well as processing and analysis of electromyographic signals. In the light of the undeniably high level of his publications, I would encourage Simeon Ribagin to consider the possibility to collect the obtained results in the form of a monograph in the near future.

#### **Analysis of the main fundamental and applied research contributions**

Simeon Ribagin has presented an Author's Reference with defined contributions in 5 separate groups, briefly presented as follows:

1. "Expansion of scientific results in the theory of GN and intuitionistic fuzzy sets with the aim of better theoretical understanding and their practical application in medical and biological sciences": In this field, Simeon Ribagin has formulated **3 contributions of a scientific nature** related to defining of a family of new modal operators, defining a new intuitionistic fuzzy implication, as well as extending the ICRA theory by proposing a new way to treat intuitionistic fuzzy evaluations.
2. "Application of GN and the theory of IFS in the field of medicine, rehabilitation, orthopaedic and trauma diagnostics": In this field, Simeon Ribagin has formulated **2 contributions of scientific-applied and purely applied nature**, related to the development of a new intuitionistic fuzzy approach for assessment of the functional state of peripheral joints, as well as GN models for decision-making in treatment and preparation of a diagnostic plan in medicine, rehabilitation, orthopaedics and traumatology.
3. "Application of new approaches to decision-making and application of ICRA in medicine, kinesitherapy and industry": In this area, Simeon Ribagin has formulated **3 contributions of scientific-applied and purely applied nature**, related to the first application of ICRA for the assessment of the functional status of patients with Behterev's disease, when searching for dependencies in data from transfusion haematology centres in Bulgaria, as well as for supporting decision-making in the oil industry.
4. "Research of electromyographic potentials in normal and pathological conditions": In this field, Simeon Ribagin has formulated **2 contributions of purely applied nature**, namely the development of an experimental set-up for the purpose of studying muscle activity by means of surface electromyography in healthy subjects and in patients who underwent a stroke, as well as the statistical analysis of



experimental data obtained from electromyographic studies in order to detect differences in muscle reaction and activity in normal and pathological conditions.

5. "Overview analysis of the research related to the theory and applications of metaheuristic algorithms": Simeon Ribagin has presented an overview study of the results of the researchers from the Bulgarian Academy of Sciences over the past 20 years related to the theory and applications of metaheuristic algorithms. Both new metaheuristic algorithms, their modifications and hybridizations, as well as the main areas of their application are presented.

Without aiming to prioritize the contributions formulated by Simeon Ribagin, I would like to highlight the **scientific-applied and purely applied contributions** as a direct response to the need for science to be developed for the benefit of society and industry. For example, the constructed GN models are aimed at helping specialists (when studying the logic of the processes related to functional diagnosis and rehabilitation treatment), students and specialists in orthopaedics and traumatology (when acquiring diagnostic skills), as well as when checking their knowledge with real-time simulations. I also find the efforts to support the decision-making processes in the oil industry as very focused. The application of ICRA in this area allowed solving a series of specific tasks, such as determining types of oil with similar properties, compatibility indices between types of crude oil, etc. In this way, based on previous experience in oil refining, new potentially profitable types of oil can be selected for processing in an oil refinery.

**I consider the so formulated contributions of Simeon Ribagin as original and reflecting his overall scientific research activity.** I am convinced in my opinion that his **contributions are of essential importance** for the development of the field of research in the application of modern informatics approaches for the purposes of diagnosis and rehabilitation in various pathologies, functional diagnostics of the musculoskeletal system, processing and analysis of electromyographic signals, etc. **The high number of citations** of the research works of Simeon Ribagin is yet **another independent testimony** for the quality of the excellent research results achieved with his active participation.

#### Personal impressions

I personally know Simeon Ribagin from our joint participation in an international project, as well as in my capacity as his scientific consultant on a project on the topic "Generalized net modelling in the field of orthopaedics and traumatology" under the "Programme to support young scientists at BAS". Over the years, Simeon Ribagin has established himself as a **responsible, conscientious and highly organized colleague, exceptionally hard-working and diligent, as well as highly self-demanding**. All of these personal qualities are demonstrated in the materials presented by Simeon Ribagin for participation in the present concourse for the academic position "Associate Professor".

#### Conclusion

In the formation of the final assessment of the candidate Simeon Ribagin for promotion to the academic position "Associate Professor", the requirements of the ADASRB have to be taken into consideration, as well as the regulations for its application approved by the Council of Ministers, and BAS, and the specific regulations of IBPhBME – BAS. With respect to the presented documents, **Senior Assist. Prof. Simeon Ribagin meets, and even surpasses, the requirements set for the academic position "Associate Professor"**.

On the basis of the presented concourse documents and the candidate's publications, which provide visibility of the obtained results, as well as on the basis of the notability of the scientific contributions included thereof, I take the liberty to recommend to the respected members of the Scientific Jury to propose to the Scientific Council of IBPhBME – BAS to vote for the promotion of **Simeon Aleksandrov Ribagin, PhD** to the academic position **"Associate Professor"** in Professional Field **4.6. Informatics and Computer Sciences, Scientific Specialty Informatics**.

11 July 2022  
Sofia

Signature: ....

(Prof. Tania Pencheva, PhD)