

STATEMENT

From Prof. Jana Tchekalarova

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Subject: Competition for the occupation of the academic position "Assoc. Professor", Higher Education 4 "Natural Sciences, Mathematics, and Informatics", Professional Direction 4.3. "Biological Sciences", Scientific Specialty "Biophysics", for the needs of the Institute of Biophysics and Biomedical Engineering (IBPhME) at the Bulgarian Academy of Sciences, Transmembrane Signaling Laboratory

1. Procedural issues

In the announced competition for the academic position of "Associate Professor" in professional field 4.3. "Biological Sciences," scientific specialty "Biophysics" at the IBPhBME-BAS, announced in the State Gazette, issue: 58, dated 18.7.2025 and in accordance with Order 632 of 01.08.2025, a single candidate appeared – Dr. Sonya Nikolova Apostolova, currently working as a senior assistant in the "Transmembrane Signaling" laboratory at the IBPhBME-BAS. The documents submitted by Dr. Apostolova for participation in the competition show that the procedure for its disclosure and announcement has been complied with and is fully in accordance with the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria (ZRASRB), as well as the Regulations on the conditions and procedures for acquiring scientific degrees and occupying academic positions at BAS and the Regulations of IBPhBME-BAS. The scientific works submitted for the competition do not repeat those listed in the abstract of the dissertation for the award of the educational and scientific degree "Doctor".

I declare that I have no conflict of interest in relation to the announced competition.

2. Education and career development

Senior Assistant Professor Dr. Sonya Nikolova Apostolova graduated in 2023 from Sofia University "St. Kliment Ohridski", Faculty of Biology, and obtained a master's degree in Virology. During her studies and after her master's degree, she worked at the Institute of Experimental Morphology, Pathology and Anthropology with Museum, Bulgarian Academy of Sciences (IEMPAM-BAS) as a specialist biologist until 2014, after which she rejoined the IBPhBM as a specialist. Between 2015 and 2021, Sonya Apostola was a doctoral student at the University of Leiden and the Leiden Biomedical Research Institute, Spain. After successfully defending her dissertation with honors, Sonya Apostola was reappointed as a specialist biologist at IBPhBME-BAS, and a year later she was appointed to the position of "senior assistant," which she still holds today.

3. Scientific indicators

The comparative analysis of the minimum national requirements under Article 2b of the Higher Education Act for the field of higher education Field of higher education 4.1. "Natural Sciences, Mathematics, and Informatics," Professional field 4.3. "Biological Sciences" and the Regulations of the IBPhBME-BAS with the attached reference from the candidate shows that Dr. Sonya Apostola meets the minimum national requirements for the academic position of "associate professor." A detailed analysis of the relevant groups of indicators shows that the candidate exceeds the minimum requirements for the number of points for certain indicators according to the Regulations of the IBPhBME – BAS for the academic position of "Associate Professor", namely:

Indicators A - 50 points (50 points required), B4 - 100 points (100 points required), G7 - total 225 points (220 points required), Indicator D is 88 points with a minimum requirement of 60 points. Total: 463 out of a minimum requirement of 430 points. Additional points from indicator E – 190 points /E14 – 70 points + E15 – 100 points + E20/.

Senior Assistant Apostolova has participated in a total of 7 research projects funded by Bulgarian institutions, 5 international projects, and one Bulgarian project, which she leads and which is funded by the National Science Fund, which defines her activity as very intensive and productive. This is evidenced by the total number of publications according to Scopus – 21, half of which (10) have been published in the last two years.

Her dissertation, which received an excellent grade and was defended in 2021, is on the topic: "The role of the NSE1 RING domain in the stability of the Smc5/6 complex and genomic integrity in human cells" with scientific supervisors Assoc. Prof. Dr. Jordi Torres Rosell and Assoc. Prof. Dr. Neus Colomina.

According to the information provided by the Scopus and Web of Science databases, 87 citations of her publications (excluding self-citations by all authors) have been found in specialized scientific journals, with an H-index of 6 according to Scopus. The distribution of the journals by quartiles with which Apostolova participates in the competition is as follows: 9 articles in Q1; 4 articles in Q2; 2 articles in Q3.

The scientific contributions presented are of a fundamental and applied medical-biological nature.

4. Analysis of scientific contributions

The main contributions from the scientific research activity of Senior Assistant Prof. Apostolova are systematized and reflected in the "Habilitation Report" attached to the competition documents and are summarized in three main areas.

Dr. Apostolova's developments included in the first area would contribute significantly to the standardization and development of new potential therapeutic strategies, as well as the identification of the most effective sources of natural compounds for the treatment of metastatic and triple-negative breast cancer through the use of natural and modified synthetic molecules.

Dr. Apostolova's research also contributes to improving the pharmacological properties of existing substances (betulinic acid through its modification to solve the problem of its low water solubility). All this lays a solid foundation for future preclinical and clinical studies aimed at creating new, effective, and selective drugs to fight breast cancer.

The contributions summarized in the second direction have a specific practical application related to: 1) the development of antibacterial and biocompatible materials for wound treatment - 3D matrices and constructs; 2) scientifically based assessment of the safety, long-term stability, and clinical safety of orthopedic implants.

The results of these studies contribute to a scientifically sound basis for the safe use of materials in hip replacement. Contributions in this area would contribute to the creation of functional 3D matrices that stimulate angiogenesis. The studies summarized in this area are also practical in nature and contribute to applications in regenerative medicine. The mechanism responsible for improved cell functionality (matrix-induced endothelial cell adhesion and enhanced angiogenesis) has been established, as has the role of the electric field in angiogenesis.

I believe that the third area should be divided into two separate areas, as there is no common link between therapeutic approaches to diabetic neuropathy and the role of melatonin deficiency in the aging process.

In this area, studies are of fundamental and clinical importance for revealing new, previously unexplored mechanisms and therapeutic approaches for the treatment of diabetic neuropathy and age-related neurodegenerative processes, providing a scientific basis for future clinical application. The results suggest riboflavin as a promising candidate for future studies in people with diabetic neuropathy. With regard to liraglutide, its previously unexplored effect on reducing neuropathic pain in diabetes and its mechanism of action have been established.

A direct link has been demonstrated between melatonin deficiency and impaired regulation of sphingolipid metabolism in the brain—a key pathway associated with the development of diseases such as Alzheimer's.

Given that Senior Assistant Professor Apostolova is the head of a research project funded by the National Science Fund, and that in some of the articles submitted for the competition she is the lead or second author, I believe that they should be considered as part of the research project. Apostolova is the head of a research project funded by the National Science Fund, and in some of the articles submitted for the competition she is the lead or second author, I believe that they have been fully realized with her active participation and are her personal achievement, which is very well summarized in the contributions presented.

Conclusion

With the evidence provided, the candidate, Senior Assistant Professor Sonya Apostolova, fully meets the scientometric criteria (minimum requirements in the ZRASRB and the Regulations of the IBPhBME-BAS) for the award of the academic position of "associate professor." She has proven herself to be an established scientist with expertise in several scientific fields. This gives me reason to give a positive opinion and to confidently propose to the members of the esteemed

Scientific Jury to vote for the awarding of the academic position of "associate professor" to Senior Assistant Professor Sonya Apostolova in Professional Field 4.3. "Biological Sciences," scientific specialty "Biophysics," for the needs of the "Virology, Transmembrane Signaling Laboratory" at the IBPhBME-BAS.

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Opinion prepared by:

/Prof. Dr. Yana Chekalarova/