

REVIEW

by Prof. Dr. Maria Georgieva Marudova-Zsivanovits

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of the materials submitted for participation in the competition for the academic position of Associate Professor in the Department of Physics and Biophysics, Faculty of Pharmacy, Medical University – Varna.

1. General presentation of the procedure

By Order No. P-109-265 dated 30.07.2026 of the Rector of the Medical University – Varna, I was appointed as a member of the scientific jury for the competition for the academic position of Associate Professor in the specialty Physics, in the field of higher education 4. Natural Sciences, Mathematics and Informatics, professional field 4.1. Physical Sciences, announced in the State Gazette No. 50/02.06.2026 for the needs of the Department of Physics and Biophysics, Faculty of Pharmacy, Medical University – Varna. Dr. Natalina Konstantinova Panova, PhD, Chief Assistant Professor in the same department, has submitted her application for the announced competition.

At the first meeting of the scientific jury, held on 11.08.2026, I was assigned to prepare a review of the materials submitted by the candidate in electronic form. The materials comply with the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for the Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria (RILDASRB), and the Regulations for the Development of the Academic Staff of the Medical University – Varna (RDAS). They include: 1) an application in the prescribed form to the Rector for admission to the competition; 2) curriculum vitae; 3) diploma for higher education with a Master's degree; 4) diploma for the educational and scientific degree of Doctor (PhD); 5) certificate of recognized specialty in Biophysics; 6) certificate of employment experience; 7) certificate of teaching experience; 8) statement of teaching workload; 9) medical certificate; 10) certificate of criminal record; 11) personal data protection notice; 12) declaration of authenticity of the submitted documents; 13) academic record of the candidate's publications, citations and research profiles, issued by the Library of the Medical University – Varna; 14) list of publications equivalent to a habilitation monograph; 15) extended habilitation report; 16) abstracts of the scientific works in Bulgarian and English; 17) statement of original scientific contributions; 18) list of participation in national and international scientific events; 19) similarity report; 20) other documents.

2. Brief biographical information about the candidate

Natalina Konstantinova Panova was born on 03.08.1978 in Provadia. In 2000, she obtained a Master's degree in Physics with a professional qualification of Physicist and Physics Teacher, as well as a specialization in Medical Physics and Radioecology. From 2006 to 2009, she specialized in Biophysics at the Medical University – Varna, obtaining a certificate of recognized specialty in Biophysics in 2009. From 2020 to 2024, she was a full-time PhD student in Medical Physics at the Department of Physics and Biophysics, Medical University – Varna. She obtained the educational and scientific degree of Doctor (PhD) in Medical Physics with a dissertation entitled “Corrosion Resistance in Biological Fluids of AISI 321 Austenitic Stainless Steel after Laser Surface Treatment”. In 2024–2025, she also obtained a Master's degree in Artificial Intelligence in Biomedicine.

The candidate's professional career has been associated with higher education and the Medical University – Varna. From 2001 to 2008, she worked as an Assistant Professor at the Faculty of Public Health, Department of Medical Physics, Chemistry and Biology, Division of Physics and Biophysics. From 2008 to 2024, she held the position of Assistant Professor at the Faculty of Pharmacy, Department of Physics and Biophysics, while also performing administrative functions. Since 2025, she has been Chief Assistant Professor in the same department.

3. General characteristics of the candidate's activities

The activities of Chief Assistant Professor Natalina Konstantinova Panova, PhD, are characterized by long-standing and consistent teaching, research, and administrative activity. Her professional work has developed mainly in the fields of physics, medical physics, biophysics, biomechanics, and the application of physical methods and technologies in medicine and healthcare.

The candidate's teaching activity is broad in scope and includes the education of students from various specialties and educational and qualification levels at the Medical University – Varna. Chief Assistant Professor Dr. Natalina Panova has participated in the development and/or updating of 21 curricula covering disciplines in physics, medical physics, biophysics, biomechanics, medical equipment, and optoelectronic and laser technology. The curricula are intended for students in Medicine, Dental Medicine, Pharmacy, Kinesitherapy, Biomedical Engineering and Technologies, Medical Laboratory Assistant, Medical Optician, Public Health Inspector, and Medical Cosmetician, as well as for students enrolled in Master's programs in electronic and information technologies in healthcare. Some of the curricula were developed for English-language instruction.

The candidate's teaching activity has been long-standing. From 2001 to the present, she has conducted seminars and laboratory classes in various disciplines, including medical physics, biophysics, physics and biophysics, biomechanics, medical equipment, laboratory equipment and instrumentation, as well as optoelectronic and laser technology. The teaching covers students from medical and health-related specialties as well as students from technical and interdisciplinary programs. An important contribution to the teaching activity is her participation in the development and improvement of laboratory and seminar classes, the introduction of new forms of knowledge assessment, and the development of electronic test sets in a number of disciplines.

Her educational publishing activity includes co-authorship of 4 educational publications – three collections of sample test questions in medical physics, physics and biophysics, and one laboratory manual in medical physics and biophysics. The candidate also participates in the preparation and administration of examination sessions, the processing of statistical examination results, and the admission campaign of the Medical University – Varna.

The research activity of Chief Assistant Professor Panova is developed in several interrelated areas. The main ones include medical physics and biophysics, laser technologies and their application in the treatment and study of biomedical materials, physicochemical and biophysical investigation of biologically active substances and natural products, as well as optical and fluorescence methods of analysis. Part of her research is also focused on studies with potential applications in pharmacy, food technology, and cosmetics. The research is interdisciplinary in nature, combining approaches from physics and biophysics with problems in medicine, pharmacy, biomaterials, and food technology.

The candidate's publication activity is substantial. She is an author or co-author of 60 scientific articles, 21 of which have been published in international scientific journals indexed in Web of Science and Scopus with an Impact Factor and/or SJR. The candidate has participated in 24 international and national scientific forums with papers and posters. Her scientific output has

visibility in international scientometric databases, with an h-index of 5 in Scopus and 3 in Web of Science. The total Impact Factor of the journals in which the candidate's scientific works have been published is 55.3, while the number of citations is 55 in Scopus and 26 in Web of Science, respectively.

The research activity is complemented by participation in 6 international, national, and intra-university research projects. Their topics cover corrosion processes in biological media and laser treatment of materials, the production and application of biologically active substances, investigation of the antitumor, anti-inflammatory, and antibacterial activity of plant extracts, development of research infrastructure for food supplements, and development of a portable device for three-dimensional fluorescence analysis of substances for applications in the pharmaceutical and food industries.

4. Compliance of the submitted materials with the quantitative requirements of the Regulations for the Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB)

The materials submitted by Chief Assistant Professor Natalina Panova for participation in the competition for the academic position of Associate Professor have not been used in the procedure for obtaining the educational and scientific degree of Doctor (PhD) or for appointment to the academic position of Chief Assistant Professor.

Indicator A:

Chief Assistant Professor Natalina Panova has submitted a copy of her diploma for the award of the educational and scientific degree of Doctor (PhD), which meets the required 50 points under the quantitative indicators.

Indicator B:

To meet the requirements under this indicator, the candidate has presented 10 scientific publications in journals indexed in internationally recognized scientific databases (Web of Science and Scopus), included in the extended habilitation report.

The extended habilitation report presents interdisciplinary research activity focused on the study and application of natural bioactive substances and functional materials. The main areas include the characterization and evaluation of bioactive components from algae, medicinal plants, and other natural sources; the development of functional systems for food, pharmaceutical, and cosmetic applications; and the use of modern spectroscopic and analytical methods for their investigation. A separate area comprises studies of laser-modified metallic materials and their corrosion resistance in biological media with a view to biomedical applications.

Two of the articles are in the second quartile, four in the third quartile, three in the fourth quartile, and one has only an SJR, resulting in a total of 146 points under this indicator, compared with the required 100 points.

Indicator G:

Under this indicator, Chief Assistant Professor Natalina Panova presents 9 scientific articles that follow the research areas outlined above. All of them have been published in scientific journals ranked in Q1. With a total of 225 points, Chief Assistant Professor Natalina Panova fully meets the requirements under Indicator G.

Indicator D:

Under Indicator D, Chief Assistant Professor Natalina Panova presents 15 articles that have received a total of 54 citations in scientific publications indexed in internationally recognized scientific databases (Web of Science and Scopus). Through the citation of her scientific works, the candidate meets the required 50 points under Indicator D according to the Regulations for the Implementation of the LDASRB.

The national minimum requirements for appointment to the academic position of Associate Professor and the candidate's fulfillment of these requirements are summarized in the following table:

No.	Indicator group	Minimum number of points according to the Regulations for professional field 4.1. Physical Sciences	Points achieved by Chief Assistant Professor Natalina Panova
1	A	50	50
2	B	100	146
3	G	200	225
4	D	50	108

5. Scientific and scientific-applied contributions of the candidate, and recognition within the scientific community

The scientific results presented in the works of Chief Assistant Professor Natalina Panova cover several interrelated areas combining the study of natural bioactive substances, the development of functional systems, and applied materials science. Depending on the nature of the results obtained, the contributions can be classified as scientific, scientific-applied, and applied.

Scientific contributions:

- New data have been obtained on the chemical composition and biological activity of natural bioactive substances, including essential oils from medicinal plants, extracts of *Moringa oleifera*, *Chlorella vulgaris*, propolis, and other natural sources.
- Relationships have been established between the chemical and metabolic composition, physical characteristics, and biological activity of the natural products studied, including the influence of origin and particle size on the properties of *Chlorella vulgaris*.
- The patterns governing the stability and retention of phycocyanin in Ca(II)-alginate matrices under different conditions and the influence of the hydrocolloids used have been investigated.
- A relationship has been established between the microstructure of laser-modified AISI 321 stainless steel and the nature of its corrosion damage in biological media, and a mechanism for the development of corrosion pits has been proposed.

Scientific-applied contributions

- The feasibility of using a combination of fluorescence, UV-Vis, FTIR, and Raman spectroscopy for the characterization and qualitative assessment of natural products, including vegetable oils and plant materials, has been demonstrated.

- Conditions for the stabilization and incorporation of bioactive components into polymeric and dispersed systems have been determined, as well as the release patterns of polyphenolic substances from biodegradable polymer films.
- Approaches for modifying the functional properties of materials through the incorporation of natural bioactive components and laser surface treatment have been developed and evaluated.
- Modern technologies for 3D printing of pharmaceutical dosage forms have been analyzed and systematized with a view to their application in personalized medicine.

Applied contributions

- Specific functional formulations and products based on natural components have been developed, including emulsions with *Arthrospira platensis*, Ca(II)-alginate microspheres containing phycocyanin, cosmetic creams with natural oils, and bioactive PLA films.
- Functional food products supplemented with microalgae (*Spirulina* and *Chlorella*) have been obtained, and technological conditions for their production and quality assessment have been determined.
- Results have been obtained demonstrating the potential use of laser-modified AISI 321 stainless steel in components operating in biological media, with potential applications in dental and implant structures.

6. Assessment of the candidate's personal contribution

The assessment of the candidate's personal contribution is based on her authorship position and the thematic consistency of her scientific output. Of the 19 publications submitted for participation in the present competition, Chief Assistant Professor Panova is the first author of 4 publications and the second author of 4 publications. In the remaining works, she participates as a co-author, with her research interests covering natural bioactive substances, spectroscopic and analytical methods for their characterization, functional polymer systems, and applied materials science.

In view of the absence of a detailed distribution of tasks among the co-authors, the candidate's specific contribution to the individual publications cannot be determined exhaustively. Nevertheless, the overall publication record provides grounds for assessing her personal contribution as substantial and sustained.

7. Critical remarks and recommendations

I have no critical remarks concerning the materials submitted for the competition. As a recommendation, the further development of spectroscopic and optical methods toward quantitative models and validated analytical approaches could be pursued, which would expand their potential for routine quality control of natural products.

CONCLUSION

The documents and materials submitted by Chief Assistant Professor Natalina Panova, PhD, fully comply with all requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for the Implementation of the LDASRB, and the relevant Regulations of the Medical University – Varna.

The candidate has presented a substantial number of scientific works published after those used for the defense of her doctoral dissertation and appointment to the academic position of Chief

Assistant Professor. The scientific works of Chief Assistant Professor Natalina Panova, PhD, contain original scientific, scientific-applied, and applied contributions that have received international recognition. The candidate has also achieved significant results in teaching. The scientific and teaching qualifications of Chief Assistant Professor Natalina Panova, PhD, are beyond dispute.

Based on the above, I give my positive assessment and recommend that the Scientific Jury prepare a report-proposal to the Faculty Council of the Faculty of Pharmacy of the Medical University – Varna for the appointment of Chief Assistant Professor Natalina Panova, PhD, to the academic position of Associate Professor at the Medical University – Varna in the field of higher education 4. Natural Sciences, Mathematics and Informatics; professional field 4.1. Physical Sciences (Physics).

3 October 2026

Plovdiv

Reviewer:.....

Prof. Dr. Maria Marudova-Zsivanovits