

REVIEW

by Professor Plamen Ivanov Zagorchev, DScB,

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Member of the Academic Jury appointed by Order No. P-109-265/30.07.2026

of the Rector of Medical University – Varna.

SUBJECT: Competition for the academic position of Associate Professor in higher education area 4. Natural Sciences, Mathematics and Informatics, professional field 4.1. Physical Sciences, specialty Physics, announced in the State Gazette, issue 50 of 02.06.2026. Candidate: Chief Assistant Professor Natalina Konstantinova Panova, PhD (Physics), Department of Physics and Biophysics, Faculty of Pharmacy, Medical University – Varna.

1. General overview of the submitted materials

The materials submitted for review in hard copy and electronic format comply with the procedure for appointment to the academic position of Associate Professor at Medical University – Varna, the University's Regulations for the Development of the Academic Staff, and the Act on the Development of the Academic Staff in the Republic of Bulgaria. The competition dossier has been properly prepared and includes all required full-text materials.

In my capacity as a member of the Academic Jury for the procedure for awarding the educational and scientific degree of Doctor, I reviewed the dissertation of Chief Assistant Professor Natalina Panova in 2024. The present procedure assesses her research output and her development in research and teaching in relation to appointment to the academic position of Associate Professor.

The submitted materials have been assessed in accordance with the requirements of the Regulations for the Development of the Academic Staff at Medical University – Varna. In addition to fulfilment of the minimum indicators, the outcomes of teaching, research and applied research activities have been considered.

2. Brief biographical information about the candidate

Natalina Konstantinova Panova obtained a Master's degree from Konstantin Preslavsky University of Shumen in 2000. She has worked at Medical University – Varna since 2001 and currently holds the position of Chief Assistant Professor in the Department of Physics and Biophysics. In 2024, she defended a dissertation entitled “Corrosion Resistance in Biological Fluids of Austenitic AISI 321 Steel after Laser Surface Treatment” and obtained the educational and scientific degree of Doctor. The submitted information demonstrates extensive teaching experience.

3. Analysis of research output

Ten publications have been submitted under indicator B4 as an equivalent to a habilitation work, and nine publications under indicator $\Gamma 7$. The publications under B4 total 146 points when the listed values are added together; the statement reports 225 points under $\Gamma 7$ against a minimum of 200 points. The dissertation satisfies group A with 50 points, while the two publications associated with the dissertation have been excluded from the competition groups. The supplementary statement lists a total of 60 articles, with an h-index of 5 in Scopus and 3 in Web of Science. These data provide an overview of the candidate's overall research activity. The specific assessment in the present procedure concerns the 19 publications submitted under indicators B4 and $\Gamma 7$.

Table 1. Compliance with the minimum requirements for the academic position of Associate Professor under the Act on the Development of the Academic Staff in the Republic of Bulgaria, its Implementing Regulations, and the Regulations of Medical University – Varna
(professional field 4.1)

Indicator	Statutory minimum	Submitted data	Reviewer's assessment
A1	50 points	Dissertation: 50 points	Minimum met.
B4	100 points; equivalent to a habilitation work comprising ≥ 10 full-text indexed articles	10 articles; 146 points	Requirements for number and points met.
G7	Group Γ : ≥ 200 points, including ≥ 60 points under $\Gamma 7$	9 articles; 225 points entirely under $\Gamma 7$	Both thresholds met.

D11	Group D: ≥ 50 points; 2 points per eligible citation	54 claimed citations = 108 points	Duplicate records and citations by co-authors are present; the adjusted provisional assessment exceeds 50 points, subject to bibliographic verification.
Teaching experience and workload	≥ 5 years of teaching and an annual average of ≥ 100 hours over the last 10 years	Teaching since 2001; table of teaching hours by subject and period	Teaching experience is evident; the hours cannot be verified from the submitted table.

A total of 54 citations have been claimed under indicator D11. I identified four duplicate entries in the list; after their removal, no more than 50 separate citing records remain, corresponding to 100 points before verification of citations by co-authors and indexing. If the six identified citations by co-authors are also excluded, the provisional total is 44 citations, or 88 points. This is the outcome of the reviewer's examination and should be confirmed by a corrected library statement. Even under this more stringent assessment, the required minimum of 50 points is met.

4. Research areas and relevance

One of the principal areas of Chief Assistant Professor Panova's research is the investigation of laser-treated AISI 321 steel. The morphology of the melted layers and corrosion damage in Ringer's solution and artificial saliva have been examined. The publications in *Procedia Structural Integrity and Processes* from 2025 continue the doctoral research topic and are directly related to the application of physical methods in materials science. Pitting and crevice corrosion, as well as selective degradation of the δ -ferrite phase, have been identified. The results are relevant to the assessment of the material. However, I consider that conclusions concerning its application should clearly distinguish laboratory-established corrosion resistance from demonstrated clinical durability. Another area comprises spectroscopic, optical and materials studies of natural products, hydrocolloid particles, polymer films and cosmetic systems. Collaborative studies on the composition and biological activity of *Moringa oleifera* and *Chlorella vulgaris* have also been submitted. In some of these studies, the contribution of physics is clearly evident through

spectroscopic investigations, particle size determination, rheological measurements and testing of release systems. In other publications, the principal findings fall within chemistry, food technology and pharmacology. This diversity is valuable for interdisciplinary work within the Faculty of Pharmacy, but a competition in the specialty of Physics requires a clearer account of the candidate's own methodological role.

The submitted review on 3D printing of pharmaceutical products for personalised medicine demonstrates familiarity with contemporary technologies and the materials employed. I regard it as a useful analytical contribution, without classifying it among the new experimental findings.

The ten papers submitted in place of a monograph fulfil the formal requirement concerning their number. In my view, their thematic diversity makes it difficult to identify a coherent research line of the kind expected in a habilitation work. This is my principal critical observation concerning the research output.

An expanded habilitation statement of 37 pages has been included in the competition dossier. It provides a more detailed account of the methods used and the results obtained. The studies most directly related to the subject of the competition concern comparisons of the optical spectra and chemical composition of plant oils, spectroscopy of *Moringa oleifera*, rheological studies of emulsions, physicochemical characterisation of alginate beads, release kinetics from polymer films, and microstructural analysis of AISI 321. Seven commercial samples containing rosehip oil have been comparatively analysed using GC-MS, UV-Vis, FTIR, fluorescence matrices and a smartphone spectrometer. The proposed approach has practical value as a low-cost screening method, but its use for routine detection of adulteration requires an independent sample set and quantitative validation. In the alginate beads, phycocyanin retention was found to depend on pH, temperature and the added polysaccharide; however, the data obtained do not directly demonstrate bioavailability or controlled delivery in vivo.

The expanded statement also contains a specific inconsistency that should be corrected. On page 19, a group of oils is described as " ω -6-dominant", while a content of 45–51% α -linolenic acid, which is an ω -3 fatty acid, is reported for that group. It is necessary to verify whether the error concerns the name of the acid or the designation of the group.

The corrosion studies were conducted in laboratory solutions and include an analysis of pit morphology. No tests of the biocompatibility or durability of an actual implant structure have been presented. The analysis of 3D printing likewise does not constitute experimental evidence that any one method is the most suitable for all pharmaceutical products. In this statement, as in the statement

of original contributions, Panova's individual tasks are not distinguished from the collective work of the co-authors.

5. Assessment of the contributions and the candidate's personal involvement

The statement of original contributions identifies three research areas: biologically active substances, algae and materials science. I consider that the findings concerning Ca(II)-alginate carriers containing *Arthrospira platensis* extracts, the metabolic profile and particle size of *C. vulgaris*, and the mechanism of corrosion damage in laser-melted layers have scientific and applied value. For studies involving biological models, I would recommend restricting conclusions about therapeutic potential to the available *in vitro* and *ex vivo* evidence.

The candidate is the first author of 3 of the 9 publications under Γ7 and of the review on 3D printing in group B4. This supports an active role in preparing these papers, but does not, by itself, establish who developed the methodology or performed the specific experiments. No allocation of author responsibilities for conceptualisation, experimentation, data analysis and related tasks has been provided. For publications involving large teams, this omission makes it difficult to assess an independent research line in Physics. The clearest thematic continuity with the dissertation is evident in the two studies on AISI 321, but personal involvement in laser treatment, electrochemical testing, OM/SEM/EDS/EBSD analysis and interpretation of the mechanism should also be specified for these papers. The studies on *Moringa*, *Chlorella*, alginate particles and essential oils likewise do not specify the activities performed by the candidate. Co-authorship alone does not give me grounds to conclude that the *ex vivo* smooth-muscle experiments, microbiological experiments and chemical experiments were conducted by Panova.

6. Assessment of citations

The library statement reports 54 citations, corresponding to 108 points. On examining the attached list, I identified four apparently duplicate records referring to the same cited publications. Two concern the article by Sachelarie and co-authors and the conference paper by Nikolova citing the review on laser technologies in dentistry. The other two concern the papers by Suharno and co-authors and by Gołębski/Gobski and co-authors, since the same publication on the microstructure of AISI 321 is listed as a cited work under entries 1 and 10. After removal of these duplicates, 50 separate citing records relating to the respective papers remain, corresponding to 100 points at the rate used in the statement.

I also identified at least 6 citations by authors who are co-authors of the respective cited paper: 4 relating to the publication on *Sambucus nigra*, citing entries 6, 7, 11 and 12; one relating to the study on cosmetic creams; and one relating to the article on *C. vulgaris*. These cases should be distinguished from direct self-citation by Panova, as she is not listed as an author of any of the six citing papers. If the applicable rules also exclude citations by co-authors, the two adjustments yield a conditional total of 44 citations, or 88 points. Against the required minimum of 50 points under D11, this indicator remains fulfilled even under this assessment. I consider it necessary to correct the library statement and verify indexing and the complete author lists.

7. Teaching and organisational activities

Chief Assistant Professor Panova has extensive teaching experience across a broad range of subjects. According to the submitted statement, since 2001 she has taught seminars and laboratory classes in Medical Physics and Biophysics for students of Medicine, Dental Medicine and Pharmacy; Biomechanics and Biophysics for the Kinesitherapy programme; Biophysics, Biomechanics, and Optoelectronic and Laser Technology for the Biomedical and Health Technologies programme; Laboratory Technology for Medical Laboratory Technicians; Medical Physics for Medical Opticians and Public Health Inspectors; and Equipment in Cosmetics for Medical Cosmeticians. Since 2025, classes in Optoelectronic and Laser Technology have been included in several Master's programmes. She has also taught practical classes at medical colleges and university branches.

Specific teaching achievements reported include the development and introduction of one new laboratory exercise in Physics in 2006/2007, and the development or improvement of the theoretical material used to prepare students for 4 laboratory exercises in Physics and one in Biophysics. New seminar exercises have been developed in Biomechanics and Biophysics for Kinesitherapy since 2018/2019, in Biomechanics for Biomedical Engineering since 2019/2020, and one exercise in Equipment in Cosmetics since 2021/2022. Electronic test sets are reported for 7 subjects and programmes, covering Medicine, Dental Medicine, Pharmacy, Kinesitherapy, Biomedical Engineering and Medical Cosmetics.

Twenty-three entries document participation in developing or updating curricula in Physics, Biophysics, Physics and Biophysics, Biomechanics and Biophysics, Biomechanics, Optoelectronic and Laser Technology, Equipment in Cosmetics, and Medical Physics. These concern different programmes, modes of study and languages of instruction, including English-language programmes. Panova is a co-author of 3 collections of sample test questions (ISBN 978-619-221-359-6, 978-619-221-322-0 and 978-619-221-330-5), and of a laboratory manual in Medical Physics and Biophysics

for the Pharmacy programme (ISBN 978-619-221-483-8). In my view, this work is of substantial value to the practical training of students and merits a positive assessment.

Regarding teaching activity, the attached table does not allow a reliable calculation of the average annual teaching workload, as it lists different periods and programmes without the actual hours recorded for each of the last 10 years. These observations do not alter my positive assessment of the practical teaching work.

The candidate's organisational activities comprise serving as an administrative assistant (since 2014) and as the person responsible for departmental assets (since 2020).

8. Scientific meetings and projects

The submitted list of scientific meetings contains 25 numbered entries, whereas the summary statement reports 24 participations with oral presentations and posters. One participation may have been without a scientific presentation, but the documents do not explain the difference. Participation in 6 research projects has also been reported.

9. Critical observations and recommendations

I have the following critical observations and recommendations concerning the submitted materials:

- 1) the four duplicate citing records should be corrected, and citations by co-authors should be identified separately;
- 2) the candidate's personal contribution in physics and methodology to the collaborative studies should be specified;
- 3) the figures of 24 and 25 scientific meetings should be reconciled.

In the table accompanying the statement of original contributions, the publication on the spectra of *Moringa oleifera*, DOI 10.1177/1934578X251349296, appears twice with different bibliographic descriptions. It should be counted as a single scientific paper. For the summarised findings concerning *Hypericum perforatum*, emulsions containing *Spirulina*, and the pharmacokinetic properties of phycocyanin, I recommend providing precise references to the relevant publications and specifying the candidate's personal involvement. The terms "for the first time", "demonstrates" and "therapeutic potential" should be substantiated in relation to the available literature and the capabilities of the experimental model used.

I also have two questions for Chief Assistant Professor Panova at the final meeting of the Academic Jury. Which measurements and methods in the publications on natural products and functional systems did she personally develop or perform, and how, in her view, do they define her own research line in the specialty of Physics? What additional experiments are needed for the findings on AISI 321 corrosion and the biological activity of algae to support practical medical applications?

10. Personal impressions

I do not personally know Chief Assistant Professor Natalina Panova. My impressions are based on the submitted competition materials and on my review of her dissertation. I assess the results obtained on that basis. I cannot regard an independent role in individual collaborative studies as established where it has not been specified in the documents.

Conclusion

The materials submitted for review demonstrate Chief Assistant Professor Natalina Konstantinova Panova's development since obtaining the educational and scientific degree of Doctor, her sustained work in teaching and the development of teaching materials, and her ability to participate in interdisciplinary research teams. Her research output and its citation record provide grounds for a positive assessment.

Following my analysis of the submitted research output, scientific and applied findings, and teaching activities, I find sufficient grounds to give a positive assessment. I will vote in favour of the appointment of Chief Assistant Professor Natalina Konstantinova Panova, PhD (Physics), to the academic position of Associate Professor in professional field 4.1. Physical Sciences, specialty Physics.

Date: 01.10.2026

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Reviewer: ...

/Prof. Plamen Ivanov Zagorchev, DScB/

Заличено на основание чл. 5,
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