REVIEW

by Prof. D.Sc. Eng. Hristo Kostov Skulev
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Regarding: The competition for the academic position of Professor in professional field 5.7. "Architecture, Civil Engineering and Geodesy", scientific speciality "Building Materials, Products and Technologies for Their Production", for the needs of the Department of Building Construction and Facilities at the Faculty of Architecture of Varna Free University "Chernorizets Hrabar", announced in the State Gazette, No. 69 of 31 July 2026.
Candidate: Assoc. Prof. Dr. Eng. Rositsa Veselinova Petkova-Slipets

1. General Overview of the Competition and the Candidate's Professional Development

This review has been prepared pursuant to Order No. 603/30 September 2026 of the Rector of Varna Free University "Chernorizets Hrabar" and the decision adopted at the first meeting of the Scientific Jury on 7 October 2026 concerning the appointment of reviewers for the competition.

The competition for the academic position of Professor has been entered by Assoc. Prof. Dr. Eng. Rositsa Veselinova Petkova-Slipets, a lecturer at the Department of Building Construction and Facilities at the Faculty of Architecture of Varna Free University "Chernorizets Hrabar", Dean of the Faculty and Head of the Technology Transfer Office.

This review has been prepared on the basis of the materials submitted for the competition and an assessment of the candidate's research, applied research, teaching, project-related and organisational activities.

The candidate obtained a Master's degree in Metal Technology and Metalworking Machinery from the Technical University of Varna in 1999 and the educational and scientific degree of Doctor in 2004. During the period 2002–2003, she specialised at École Polytechnique de l'Université de Nantes, France.

Since 2006, her professional career has been associated with Varna Free University "Chernorizets Hrabar", where she has successively held the academic positions of Assistant, Chief Assistant and Associate Professor. She subsequently assumed important administrative responsibilities, including those of Scientific Secretary, Vice-Dean and Dean of the Faculty of Architecture.

The candidate's professional development combines engineering training, research activities, teaching experience and the management of academic and project structures. This combination provides a basis for integrating research findings into teaching and applying them to the solution of engineering problems.

2. Assessment of Research and Applied Research Activities

The scientific output presented comprises a habilitation monograph, scientific articles and conference papers, textbooks and other works. The competition documentation lists 23 scientific

publications apart from the monograph and textbooks, including publications in journals indexed in international scientific databases. All the scientific works submitted were published after the candidate acquired the academic position of Associate Professor in 2011 and have not been used in previous procedures for the award of scientific degrees or the appointment to academic positions.

Several interrelated research areas stand out in the scientific work of Assoc. Prof. Petkova-Slipets.

First area – Experimental investigation of the thermophysical properties of building materials and insulation systems.

In this field, the candidate investigates methods for determining and verifying the thermal conductivity of materials and coatings, including solutions for which conventional measurement approaches may encounter difficulties. Particular attention should be given to the comparison between the classical Dr. Bok method and the transient plane heat source method (MTPS) for the assessment of thermal insulation coatings.

The applied research value of these studies lies in the experimental verification of the thermophysical characteristics of new materials and in the assessment of the applicability and limitations of the methods employed.

Second area – Modelling the thermal behaviour of building envelopes and environmentally friendly composite materials.

A 2020 publication examines materials based on clay, sand and straw through simulation analysis using Autodesk Inventor Nastran. Comparing the modelling results with analytical calculations provides an approach for assessing the adequacy of the model and investigating temperature distribution in building envelope structures.

The contribution of this work should be considered in terms of the application of numerical modelling as a complementary tool to analytical and experimental methods for assessing the thermal behaviour of alternative building materials and structures.

Third area – Physical, mechanical and acoustic properties of porous and lightweight building materials.

Studies on autoclaved aerated concrete and other materials examine the relationships between density, porous structure and functional characteristics. This research area is important for the engineering selection of building materials and the assessment of their applicability under different operating conditions.

Fourth area – Material structure and structural analysis methods.

This area forms the basis of the habilitation thesis submitted. It brings together knowledge of the structural levels of materials and the methods used to investigate them, emphasising the relationship between structure, properties and material behaviour. The subject has methodological significance both for materials science and for the practical assessment of engineering materials.

Fifth area – Modern construction technologies and digitalisation.

Publications addressing 3D printing, Building Information Modelling (BIM), digital twins and nearly zero-energy buildings examine current technological and engineering issues. These

works broaden the candidate's research profile by focusing on contemporary methods for the design, production and assessment of building materials and systems.

I positively assess the thematic diversity of the scientific output. At the same time, an overarching theme can be identified, relating to the investigation of materials, the establishment of relationships between structure and properties, and the application of the results obtained in engineering practice. This thematic connection lends a certain coherence to the candidate's research profile.

3. Assessment of the Habilitation Thesis

The habilitation thesis is the monograph Material Structure: Hierarchical Levels, Methods of Investigation, and Relationship with Properties, published in 2026 by Varna Free University "Chernorizets Hrabar", ISBN 978-954-715-818-4.

According to the information provided, the monograph comprises 164 pages, is structured into five chapters and includes 259 bibliographic references. Its subject matter covers the structural levels of materials, from the macro- and microstructural levels to the nano- and atomic levels, as well as the methods used to investigate them.

An important aspect of the work is the systematisation of a broad range of structural analysis methods, including optical and electron microscopy, X-ray diffraction, elemental analysis and spectroscopic methods. The presentation of the various methods highlights their capabilities and complementary nature. This is important because the reliable characterisation of a given material often requires the combination of different methods that provide information on different aspects of its structure and composition.

I positively assess the effort to link analytical methods with the interpretation of the results obtained and with the service characteristics of materials. The "structure–properties–behaviour" framework is suitable for integrating structural analysis with engineering tasks involving the assessment of functional characteristics and material applicability.

Despite the broad scope of the monograph, its emphasis on iron–carbon alloys and cementitious materials establishes a connection between general methodological principles and specific engineering applications.

I consider the monograph valuable both as a systematised scientific work and as a basis for teaching courses related to building materials and the methods used to investigate them. Its contribution is primarily methodological and applied, through the summarisation and integration of knowledge concerning structural analysis and its use in assessing material properties.

4. Main Scientific and Applied Research Contributions

On the basis of the materials submitted, the scientific and applied research contributions of Assoc. Prof. Dr. Eng. Rositsa Petkova-Slipets can be summarised in the following groups:

Methodological contributions to the structural analysis of materials – systematisation of methods for investigating different structural levels and justification of an integrated approach to interpreting the results.

Contributions to the experimental assessment of thermophysical properties – investigation and comparison of methods for determining the thermal conductivity of building and insulation materials, including assessment of the applicability and limitations of the methods employed.

Applied research contributions to the modelling of building envelope structures – application of numerical and analytical approaches to assess the thermal behaviour of structures, including those made from alternative and environmentally friendly materials.

Contributions to the investigation of the structure and functional characteristics of building materials – analysis of the relationships between density, porosity, thermophysical properties and acoustic properties.

Contributions related to modern construction technologies – investigation and analysis of the potential applications of additive manufacturing technologies, digital tools and sustainable materials.

Applied contributions to engineering practice and education – development of teaching materials and systematisation of knowledge applicable to the training of specialists in building materials and technologies.

These groups of contributions outline a research profile combining materials science, experimental methods, numerical modelling and engineering applications. In the final assessment of individual contributions, consideration should be given to the nature of each specific result, whether it represents new scientific knowledge, a methodological synthesis or the application of existing approaches.

5. Scientometric Indicators and Scientific Visibility

According to the submitted report on compliance with the minimum national requirements, the candidate reports a total of 1,550.99 points against a stated required minimum of 600 points.

The distribution of points by indicator group is presented in the following table:

Indicator group	Required points	Reported points
A	50	50
B	100	100
C	200	267.99
D	100	658
E	150	475
Total	600	1,550.99

According to the data submitted, 12 publications indexed in Scopus and a total of 87 citations are reported, of which 60 are in Scopus and/or Web of Science. The reported h-index values are 4 in Scopus, 3 in Web of Science and 5 in Google Scholar.

According to the report, the citations are distributed as follows: 22 in Q1 publications, 11 in Q2, 3 in Q3 and 1 in Q4, in addition to citations in non-indexed publications and monographs. These data should be considered in accordance with the reporting and verification procedures applied in the competition dossier.

The scientometric indicators demonstrate active publication output and a degree of scientific visibility. The reported total substantially exceeds the required points threshold. However, the assessment should not be based solely on the total number of points and citations. Other relevant factors include the scientific quality of the publications, their thematic relevance to the speciality of the competition, the nature of the publishing venues and the candidate's individual contribution to co-authored works.

6. Teaching Activities and Training of Young Researchers

Assoc. Prof. Dr. Eng. Rositsa Petkova-Slipets has considerable teaching experience and participates in educating students in various specialities and at different educational levels. Her teaching activities include courses related to building materials, their properties and technologies, energy-efficient construction, materials for additive manufacturing and the behaviour of structures under fire conditions.

I positively assess the development of textbooks and teaching materials, including the second edition of the textbook Building Materials, published in 2026. Updating educational content is important for maintaining the link between teaching, the development of scientific knowledge and contemporary requirements for building materials and technologies.

The development of teaching content in English for international students is also significant. This supports education in an international academic environment and broadens opportunities for attracting students.

The competition documentation also lists supervision of doctoral students, co-authorship with young researchers and participation in educational initiatives. These activities are important for developing research capacity and transferring research experience to the next generation of specialists.

7. Project-Related, Administrative and Expert Activities

The candidate has extensive administrative experience at Varna Free University "Chernorizets Hrabar", including service as Dean of the Faculty of Architecture and Head of the Technology Transfer Office.

The submitted materials list participation and coordination responsibilities in national and international projects related to the modernisation of higher education, technology transfer, the development of innovative façade systems and other applied research tasks.

These activities are complemented by editorial, reviewing and expert work, participation in scientific committees and the evaluation of research and innovation projects.

These activities complement the candidate's research and teaching profile and demonstrate experience in team organisation, working within an institutional environment and participating in initiatives to develop research and educational activities. For the academic position of Professor, such experience is important insofar as it supports the development of research areas, the training of specialists and the creation of conditions for sustainable academic cooperation.

8. Critical Remarks and Recommendations

The submitted materials allow for a positive assessment of the candidate's research activities and habilitation thesis. At the same time, several areas for further development can be identified.

First, it is advisable to further increase the international visibility of the most significant experimental and simulation results through publications in specialised scientific journals appropriate to the subject matter and quality of the research.

Second, in numerical modelling and experimental assessment, it would be beneficial to present more comprehensively the quantitative comparisons between modelled and measured results, measurement uncertainty and the limits of applicability of the models used. This would enhance the evidential strength and reproducibility of the research.

Third, the development of international scientific partnerships and joint research in sustainable building materials, energy efficiency and modern technologies could create opportunities to broaden the scope of research and participate in larger-scale scientific initiatives.

These recommendations are intended to support the further development of the candidate's research activities and more precise documentation of the results. They do not alter my positive assessment of the scientific output submitted or of the candidate's professional profile.

9. Question to the Candidate

In view of the candidate's research, teaching and administrative activities, as well as her experience in technology transfer, I would ask the following question:

What are your priorities for developing a research group in the field of building materials and energy efficiency at Varna Free University "Chernorizets Hrabar", including through international cooperation, the training of young researchers and participation in European research programmes?

CONCLUSION

Based on my analysis of the materials submitted, I consider Assoc. Prof. Dr. Eng. Rositsa Veselinova Petkova-Slipets to be an established academic and researcher with a clearly defined profile in the fields of building materials, structural analysis, thermophysical properties and modern construction technologies.

The habilitation thesis systematises knowledge concerning structural analysis methods and their relationship with the properties and behaviour of materials. The scientific publications complement this subject matter with experimental investigations, numerical modelling and engineering applications. The candidate's teaching activities, training of young researchers, participation in projects and administrative experience further strengthen the overall positive assessment of her candidacy.

I consider that the scientific and applied research output submitted, together with the candidate's teaching and organisational activities, provides grounds for a positive assessment of her candidacy.

I therefore recommend, with reasoned justification, that the Scientific Jury support the election of Assoc. Prof. Dr. Eng. Rositsa Veselinova Petkova-Slipets to the academic position of Professor in professional field 5.7. “Architecture, Civil Engineering and Geodesy”, scientific speciality “Building Materials, Products and Technologies for Their Production”, at Varna Free University “Chernorizets Hrabar”.

19 October 2026
Varna

Reviewer:

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