

OPINION

By Prof. Ivanka Tsakovska, PhD

Institute of Biophysics and Biomedical Engineering – BAS,
Member of the Scientific Jury appointed with Order № 13/06.01.2022
of the Director of the Institute of Biophysics and Biomedical Engineering – BAS

Regarding the call for the academic position “Professor”,
Area of Higher Education 4. Natural sciences, Mathematics and Informatics,
Professional Field 4.3. Biological sciences (Biophysics)
for the needs of the Biomacromolecules and Biomolecular Interactions Department,
Institute of Biophysics and Biomedical Engineering – BAS,
published in the State Gazette issue 94 dated 12 November 2021

Eligibility materials

In the call for the academic position “Professor”, there is a single applicant – Assoc. Prof. Svetla Zhelyazkova Todinova, PhD. The set of materials provided by the applicant is in accordance with the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Regulations on its implementation, the Internal Rules of the Bulgarian Academy of Sciences (BAS), and the Rules of the Institute of Biophysics and Biomedical Engineering – BAS (IBPhBME-BAS).

General presentation of the career development of the candidate

Svetla Todinova graduated from the Technical University – Sofia in 1982. Her scientific career so far has advanced at the Institute of Biophysics (since 2010 reorganised into the Institute of Biophysics and Biomedical Engineering). In 2013 she defended her PhD and since 2018 she has been appointed as an Associate Professor. An important portion of the scientific advancement of Assoc. Prof. Todinova is closely related to the Biomacromolecules and Biomolecular Interactions Department of IBPhBME-BAS for whose development she has a significant contribution.

Evaluation of the applicant’s research profile

Evaluation of the scientific metrics

Assoc. Prof. Svetla Todinova participates in the current procedure for the academic position “Professor” with 26 publications, which have not been used in the previous scientific advancement calls of the applicant. They are distributed among the criteria of the Regulations for implementation of ADASRB in the following way – 9 in Criterion C4 (all referenced and indexed in the world scientific information databases Web of Science and Scopus) and 17 in Criterion D7. In the list of publications, 7 are published in Q1 journals, 11 – in Q2 journals, and 7 – in Q3 journals. Therefore I conclude that the results are published in recognisable and well-established journals, which is a positive indication about the quality of the performed research. Except one, the publications have been produced in the period after 2016. It is remarkable that more than half (14) have been published over the past two years. This is indicative of the high present scientific commitment of the applicant. The prominent contribution to the results in the collaborative studies is evident from the leading role in most of them – in 7 publications she is the first author

and in 6 – a corresponding author. For the period 2018-2021, Svetla Todinova had 171 citations on the publications with which she participates in the current procedure, all in scientific journals, referenced and indexed in Web of Science and Scopus. This is an indication for significant interest among the scientific community in the field.

According to the documents presented, the whole scientific production of Assoc. Prof. Todinova includes 57 scientific publications, 54 of which are in journals with impact factor. 395 citations have been spotted, and the Hirsch Index according to Scopus, after exclusion of self-citations of all authors, is 12. These values are a good indicator of the applicant's scientific recognition.

An essential component of the scientific work is the participation in research projects. Assoc. Prof. Todinova has demonstrated intensive project activity – she has been a participant in nine and a coordinator of one national research project. In addition, she has participated in seven international projects – six EBR projects and one Rila project.

Evaluation of the scientific contributions

On the basis of the presented Habilitation extended report, as well as the publications, I estimate the research of Assoc. Prof. Todinova as interdisciplinary and fundamental, which is in line with her educational and scientific background. In many of the studies, the core of the author's team is from the Biomacromolecules and Biomolecular Interactions Department, but there is also a growing trend for active cooperation with a number of other Bulgarian and international research groups. These elements of interdisciplinarity and active research collaboration determine Assoc. Prof. Todinova as an advanced and promising researcher.

The research of Assoc. Prof. Todinova is related to the application of biophysical approaches for exploring various complex biological systems. I estimate the scientific contributions in the Habilitation extended report as original and correctly formulated and can summarize them in the relevant scientific fields below:

1. Assessment of the thermal and conformational stability of native proteins in biological samples and model systems, using differential scanning calorimetry. The Biomacromolecule and Biomolecular Interactions Department of the IBPhBME-BAS has worked traditionally in this direction and has a significant contribution to validating the thermodynamic approach for detecting reliable calorimetric disease markers. The scientific contributions from the studies conducted with the participation of the applicant are reflected in publications 1-9 of the presented list of publications and constitute the Habilitation work. They can be summarized as follows:

- With regard to different pathologies, methods have been developed to identify reliable disease biomarkers as well as to provide information on the effect of the applied treatment (publications 1 – 6).

- Fundamental studies have been conducted on the processes of thermal denaturation of hemocyanins, isolated from marine and terrestrial molluscs. The established thermal stability is important, given the increased interest in them as potential immunostimulatory drug agents (publications 7 – 9).

2. Study on the influence of ionic fluids on protein therapeutic targets. The obtained results improve the existing knowledge in terms of the influence of ionic fluids on the thermal and

conformational stability of proteins as well as on their cytotoxicity in neoplastic and normal cells (publications 7.1 – 7.9).

3. Identification of calorimetric characteristics of selected tumour cell lines treated with conventional and plant secondary metabolites. Using the differential scanning calorimetry, modified thermodynamic cancer cell behaviour has been identified after treatment with the drugs/extracts studied. The potential of the method for selecting effective antitumour agents has been demonstrated (publications 7.10, 7.11).

4. Study of platelet activation mechanism using atomic force microscopy and flow cytometry and identifying new biomarkers to assess the role of platelets in some pathological conditions (publications 7.12 – 7.14).

5. Study on the structural stability of the pigment-protein complexes comprising the photosynthetic apparatus of higher plants and cyanobacteria by means of differential scanning calorimetry (publications 7.15 – 7.17).

In the final part of the Habilitation extended report, the candidate has presented a clear vision for future research that will develop on the solid base of the scientific results achieved.

Fulfilment of the minimal national requirements and those of the IBPhBME-BAS

The comparative analysis on the fulfilment of the minimal national requirements for holding the academic position "Professor", as well as the specific criteria of the IBPhBME-BAS in the Area of Higher Education 4; Professional Field 4.3 is summarised in the table below.

Criterion	Minimal national requirements	Requirements of the IBPhBME-BAS	Applicant's scores
A	50	50	50
B	-	-	100
C	100	100	170 (C4)
D	200	220	335 (D7)
E	100	120	342 - 171 citations (WoS/Scopus))
F	150	150	239 - 25 τ. (Co-supervisor of 1 PhD student) - 214 τ. (Project activities and grants)
Total	600	640	1236

The analysis above has indicated that the applicant fulfills the minimal national requirements and those of the IBPhBME-BAS and exceeds them approximately twice.

The analysis of the documents shows that the applicant also fulfills the specific requirements of IBPhBME-BAS, namely: (1) to have 15 publications in journals with impact factor; (2) to have at least one defended PhD student.

Conclusion

The materials submitted for participation in this call meet and significantly exceed the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations on its implementation and the Internal Rules of the Bulgarian Academy of Sciences and the Institute of Biophysics and Biomedical Engineering at the Bulgarian Academy of Sciences.

The materials of the call, as well as my personal impressions from Assoc. Prof. Svetla Todinova, give me a reason to conclude that she is a well-established and productive researcher with high academic standards and significant research activities, which are essential for the development of the Biomacromolecules and Biomolecular Interactions Department of the IBPhBME-BAS.

Based on what has been previously said, I give a positive assessment and strongly recommend to the respected members of the Scientific Jury to vote for the appointment of Assoc. Prof. Svetla Zhelyazkova Todinova, PhD, as a Professor in the Professional Field 4.3. Biological Sciences (Biophysics) for the needs of Biomacromolecules and Biomolecular Interactions Department, Institute of Biophysics and Biomedical Engineering – Bulgarian Academy of Sciences.

18 March 2022

Member of the Scientific Jury:

/Prof. I. Tsakovska/