

R E F E R E E R E P O R T

by

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Institute of Information and Communication Technologies – BAS

Member of the Jury for the selection of the academic position "Professor"

Appointed by the Director of IICT-BAS (No. 179/19.07.2019)

Announcement:

*State Gazette, Issue. 41/21.05.2019*

Higher education area:

*4. Natural sciences, mathematics and informatics*

Professional area:

*4.5 Mathematics*

Scientific specialty:

*Mathematical Modeling and Application of  
Mathematics (Applications in Computational  
Physics and Biology)*

Applicants:

*Dr. Nevena Petrova Ilieva-Litova, Assoc. Prof.  
(sole candidate)*

**1. Brief biographical information**

Nevena Ilieva graduated in 1982 from the Faculty of Physics at Sofia University "St. Kl. Ohridski" with Master's Degree in Physics (Atomic and Nuclear Physics Profile, Theoretical Physics). In 1988, she successfully defended her doctoral dissertation in the specialty theoretical and mathematical physics at the Joint Institute for Nuclear Research (JINR)–Dubna, Russia, where she was awarded the scientific title "Candidate of Physical and Mathematical Sciences". She speaks excellent Russian, German, French and English. Since 1982 he has worked consecutively at JINR–Dubna, Russia, Institute for Nuclear Research and Nuclear Energy–BAS, gradually moving through the academic positions of Assist. Prof. III – I degree. Since 2003, she has occupied the academic post of associate professor at the Institute for Nuclear Research and Nuclear Energy–BAS until 2015, when he transferred to the IICT–BAS at the same academic position (rank) and continues to this day. During the period 1982–2019 she worked and specialized abroad in the following reputable scientific institutions: JINR–Dubna, Russia (1982–1990); Institute for Theoretical Physics, Vienna University, Austria (1996–2001); International Erwin Schrödinger

Institute for Mathematical Physics, Vienna, Austria (2001–2003) and the European Organization for Nuclear Research (CERN) Geneva, Switzerland (2003–2007). During this period, she was a leader and participant in numerous national and international scientific projects and a member of the organizing and scientific committees at prestigious international conferences.

## **2. General description of the materials presented**

The materials presented to me by Dr. Nevena Ilieva in the announced competition include: (a) CV; (b) a diploma of the Doctoral Degree; (c) a certificate of Senior degree in science; (d) a certificate of occupied academic position at ICT-BAS and an internship in the specialty; (e) a list of all scientific publications; (f) a list of the scientific publications submitted for the competition; (g) copies of the scientific publications submitted for participation in the competition; (h) a list of selected indexed citations; (i) the copyright certificate; (j) brief summaries in Bulgarian and English of the scientific publications submitted for participation in the competition; (k) a statement of eligibility for the academic position of professor and (l) a declaration of non-existence of plagiarism. All the materials provided to me have been carefully prepared and I have no doubt about their veracity.

## **3. Reflection of the Candidate's Scientific Publications in the Literature (known citations)**

I accept the candidate's "*List of selected indexed citations after 2002*" submitted by the applicant, which is made in detail and in full and contains all the necessary information. However, the way they are presented makes it difficult to read and retrieve the necessary scientometric information. This list and the table there are **100** citations to **30** publications with her participation (one publication was cited 15 times, one - 13, one - 12 times, one - 10 times, one - 6 times and the other 24 publications between 1 and 3 times).

## **4. General characteristics of the applicant's activities**

### **4.1. Scientific and applied scientific activity**

I accept both submissions from the candidate's publications – a "*List of all scientific publications*" comprising **104** titles of articles in scientific journals and two popular science articles and "*Publications of the applicant for participation in the competition*" including **23** titles, of which **17** with **Impact factor** publications (**five Q1, five Q2, five Q3, two Q4**) and **five in SJR issues**. A



review of the candidate's publications shows that the applicant does not have any individual publications submitted for the competition. Dr. Nevena Ilieva's co-authors have a varied geographical location. I have no doubt about N. Ilieva's personal contribution to each of the publications. The main results of the applicant are in the field of the announced competition; they are presented in detail, in depth and understandable in the author's reference and can be defined in several sub-areas:

- (1) *Methods for modeling, examining and visualizing the structure and dynamics of proteins* (publications numbered P4, P7, P10, P12, P13, P15, P19, P20 and P22);
- (2) *In silico studies of immunoactive molecules and complexes* (publications numbered P2, P3, P8, P9, P11, P14, P16, P18, P21 and P23);
- (3) *Modeling of physical processes* (publications under numbers P1 and P5);
- (4) *Tools and techniques for high-performance calculations* (publications under P6 and P17).

The scientific production of the candidate shows that she is a well-established, highly qualified scientist in the field of the announced competition, both in theoretical and applied aspect.

#### **4.2. Educational activities (work with students, PhD students and PhD students)**

I do not find explicitly mentioned teaching and pedagogical activity with students in the submitted documents. There is one defended and one in PhD preparation, both from China.

#### **4.3. Contributions (scientific, scientific, applied)**

The scientific output of the candidate shows that she is a well-established, highly qualified scientist, with significant scientific and applied contributions in the field of mathematical and computer modeling in computational physics and biology, both in theoretical and applied aspects. Scientific, applied or applied contributions can be found in any of the publications submitted by Nevena Ilieva. All such facts are duly and understandably described by her in the "Author Reference", with which I fully agree and do not consider it necessary to retell. For me personally, the most representative results are:

- (a) *Mathematical and computer modeling in the study and visualization of protein structure and dynamics* (Development of the *Method of Interval-Selective RMSD* (mean square root deviation) *Analysis* as a Tool for Assessing whether a MD (Molecular Dynamics) Simulation is Still Not Enough Development of a Spatio-temporal Multistage Consensus Clustering Method (SMCC) aimed at minimizing the dependence of the results of the reference structure used in their initial processing by substitution stances it with reference semi-rigid areas that enables reliable identification of the main structural sub-units of the test biomolecular complexes, as well as distinguishing the conformational effect of isolated point mutations therein. etc.); and
- (b) *In-silico studies of immunoactive molecules and complexes* (First-time full-length modeled structures of glycosylated homo-dimers of human interferon-gamma type) are being worked on; of two complementary approaches - rational protein design and in silico molecular modeling, aids in tissue and organ transplants, etc.)

#### **5. Assessment of the applicant's personal contribution**

I have no doubt about the personal contribution of the candidate in each of the publications presented.

#### **6. Critical notes**

I have no critical remarks that would be relevant to determining my position and conclusion on this competition.

#### **7. Personal impressions**

I know Nevena Ilieva from our joint work in the PRACE project and in the Scientific Computations Department of the IICT. I can confidently claim that she has established herself as an excellent, highly qualified specialist in her field of competence.

#### **8. Conclusion**

All of the above forms in me a positive attitude towards the candidate and I propose Assoc. Prof. Nevena Petrova Ilieva-Litova TO BE CHOSED FOR "PROFESSOR" position in the higher



education area 4. Natural sciences, mathematics and informatics, Professional area: 4.5  
Mathematics, Scientific Specialty: "Mathematical Modeling and Application of Mathematics  
(Applications in Computational Physics and Biology)"

September, 2019

Signature:

  
**NOT FOR  
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