

## STATEMENT

*In competition for the academic position of Associate Professor in the scientific domain, Natural Sciences, Mathematics and Informatics; scientific field 4.3. Biological Sciences (Crystallisation and structural analysis of DNA and proteins), announced in Official Gazette No. 95/14.11.2023 for the needs of the Structural Crystallography and Materials Science Department at the IMC-BAS.*

**Member of the scientific jury:** Prof. Dr. Svetla Trifonova Danova, Dsc.; "Stefan Angeloff" Institute of Microbiology/BAS, **scientific field 4.3. Biological Sciences, (Microbiology).**

### 1. Brief information about the candidate in the competition

The only candidate in the competition is Dr. Hristina Ilieva Dimitrova, Chief Assistant, Institute of Mineralogy and Crystallography "Academician Ivan Kostov"(IMC) at the BAS, for whose needs the competition was announced. She graduated in 2005. Master's degree in "Ecology and Environmental Protection" at BF - SU "St. Kliment Ohridski. In 2018 year, she successfully defended her doctorate in scientific field 4.3. Biological Sciences ("Mineralogy and Crystallography"). She has the required experience in the specialty in the field of the competition, as can be seen from the official reference presented.

### 2. Fulfillment of the requirements for occupying the academic position

#### 2.1. General characteristics of the presented scientific materials -

In order to participate in the competition for the academic position of Associate Professor, the candidate has submitted all the necessary documents. A certificate of the fulfillment of the minimum national criteria according to the law (ZRASRB) and the additional requirements for occupying the position of Associate Professor, according to the Rules of the Institute of Mineralography and Crystallography (IMC), BAS. The competition dossier is systematized and arranged according to the requirements of the Regulations to the law (ZRASRB), the CV of the candidate is arranged according to the FNI format, which presents only biographical data and information on work experience and training. According to the documents submitted, the candidate submits the following quantitative indicators of the Regulations and the law(ZRASRB) Act and the requirements of the IMC-BAS for the competition:

- For the **group A**, **50 points** were achieved based on a dissertation on the topic "Crystallization and structural analysis of two palindromic DNA sequences with fluorescent markers" (diploma No. 001037, issued on 12.07.2018). The candidate has given an accurate list of works useful for the dissertation and they are not included for participation in the current competition.

- In **group B**, the candidate is presented with 105 points based on 4 publications in international journals with Q2 and 1 in a journal - Q1, which form IF 15.7.

- **Group D** - required 200 p. Dr. Sbirikova-Dimitrova has described and calculated evidence for 290 p. They are sum formed by 23 scientific papers, but not all of them are in the mentioned international scientific journals, refereed (with IF or impact rank): 22 are in English, 1 in Bulgarian. This cannot be accepted as an article: "Hristina Dimitrova - "Business card of Dr. Hristina Dimitrova"; Journal "Bulgarian Science", (2021), issue December, pp. 18-21.; ISSN (WEB) 1314-1031. The applicant has rightly noted that 20 are in journals indexed in WoS, Scopus, ERIH+. In addition I have to note that 3 of the seven papers designated in category Q1 are only abstracts from the prestigious journal Acta



Crystallographica A-Foundation and Advances. Four papers with Q1 and 5 with Q2 form the main group of scientific publications. Eight papers are in SJR journals, quartiles Q3-2 papers and Q4 -6 papers respectively. In view of the above, the recalculated scores do not meet the 290 points indicated.

• **Group D** - The high citation rate of the presented scientific works makes an excellent impression - in the short time of 5 years, the citations of the presented works, in scientific publications, monographs, referenced and indexed in world-famous databases with scientific information (Web of Science and Scopus) **are 85 and form 170 points.**

### **2.2. General characteristics of the scientific, scientific-applied and pedagogical activity of the candidate (scientific fields and problems; prepared doctoral students and graduates).**

Dr. Hristina Dimitrova is an established specialist in an interdisciplinary field, in matters of establishing the structure of substances and the relationship between structure and properties, with potential for an ever-expanding range of objects. With the help of X-ray structural analysis, he successfully studied small organic molecules, complexes and their derivatives, DNA, proteins. Proof of which we find in the scientific works, as the first author is in 25%, and the second and next - in 75%, and based on citability, an **H-index - 5** has been achieved (without self-citations).

### **2.3. Basic scientific and/or scientific-applied contributions**

The candidate's developments are in the field of structural biology. A field that requires knowledge and skills not only in the Biological Sciences, but also in other areas of the Natural Sciences, such as Chemistry and Physics. Hristina Dimitrova has considerable experience in the crystallization of various substances (minerals, small organic molecules, porous structures and macromolecules - proteins and DNA), in the selection of conditions and the design of crystallographic experiments, in the deciphering and refinement of single crystal data and powder samples. I also positively appreciate the role of project leader **KP06-M31/1** "Co-crystallization of Alzheimer's DNA promoter sequences of the amyloid precursor (APP) gene with Thioflavin T and other fluorescent markers". This shows growth as a potential group leader to continue and expand the complex scientific field in which she works.

From the scientific papers (discussed above), it is possible to outline the personal contribution of the candidate in enriching the existing knowledge in the study of various palindromic DNA sequences related to the mechanisms of cell regulation, as well as those that successfully bind to drug forms and biologically active substances. Methodological and scientific contributions in X-ray structure analysis are presented. I highly appreciate the original scientific contributions to the research on the DNA conformation typical of B-DNA; the synthesized new homologue of Thioflavin T; the original structure of the tetradecamer oligonucleotide sequence  $d(\text{CCGGGGTACCCCGG})_2$  with **XRB**, with coordinates and structure factors deposited in the PDB under the number 8ASH and characterized interaction of **XRB** with the A-DNA form, based on strong hydrophobic interactions, etc. This is a unique proof of the candidate's readiness to work on solving complex scientific challenges in molecular biology, with the potential to reveal important regulatory mechanisms at the cellular and organismal level, as well as in basic physiological processes, as well as in revealing the etiology of non-infectious diseases.

### **2.4. Critical comments and recommendations on the submitted works -**

Dr. Hristina Dimitrova is a well-established specialist in a very important and modern fundamental scientific field - the X-rays structural analysis of important biological molecules, with opportunities for the application of scientific achievements in practice. It needs to be precisely and clearly articulated, with her personal contribution evident. In accordance with the requirements of the low (ZRASRB), abstracts cannot be equated with scientific publications in the competition.

### 3. Conclusion

The submitted documents prove that Ch. assistant prof. Dr. Hristina Dimitrova-Sibrikova successfully covers and even exceeds all scientometric indicators, according to the ZRASRB and the Rules of the IMC for occupying the academic position "associate professor".

In conclusion, the candidate is a built and promising scientist, with proven knowledge of current molecular-biological problems, with the help of crystallographic and X-ray structural analyses, on which he works successfully. As a creative researcher, she would contribute to the development of the unit, including in new interdisciplinary topics. Based on the presented materials and analysis of the achievements, I give a completely **POSITIVE assessment** and **I strongly support** the candidacy of Ch. assist. Prof. Hristina Sibrikova Dimitrova, Ph.D., for the academic position "Docent".

20.03.2024

City of Sofia

Prepared by:..........

Prof. S. Danova, PhD