

Opinion

of

Assoc. Prof. Elissaveta Vassileva Gourova,

Member of the scientific jury according to Ordinance № № 3-PK-68/01.12.2022
of the Rector of NBU

on competition for academic position

**„Associate Professor“ in professional field 4.6. „Informatics and computer sciences“
announced for the needs of New Bulgarian University in State Journal 84/21.09.2022**

For participation in the competition only one candidate presented documents:

Chief Ass. Prof. Metodi Georgiev Traykov.

1. General description of the presented materials

For participation in the competition, the candidate Metodi Traykov presented a list of a total of 8 publications, including 1 monograph, 7 scientific publications, of which 1 journal article from Q4 referenced in WoS, 6 publications referenced in Scopus.

The submitted documents comply with the requirements of ZRASRB, PPZRASRB and can be attributed to the following groups of indicators:

Group of indicators A: Dissertation for the award of educational and scientific degree "Doctor": "Mathematical models and algorithms for predicting the spatial structure of the protein".

Group of indicators B - habilitation work scientific works in referenced and indexed publications in well-known world databases with scientific information (Web of Science and Scopus):

1. Traykov, M., The Protein Folding Problem – approaches, models and algorithms, Publishing "Education and knowledge", Sofia, 2022, ISBN 978-619-7515-28-2, 208 pages.

Group of indicators G (7), Scientific publication in publications that are referenced and indexed in world-renowned databases with scientific information (Web of Science and Scopus), outside of the habilitation work*:

2. T.Z. Todorova, M.G. Traykov, A.V. Tadjer, Zh.A. Velkov, 2013. Structure of flavones and flavonols. part I: role of substituents on the planarity of the system. Computational and Theoretical Chemistry, vol. 1017, pp. 85-90. (Impact Factor: 1.403, Web of science: Q4)
3. Traykov, M., Mavrevski, R., Angelov, S., Trenchev, I. (2022). Bioinformatics: Model Selection and Scientific Visualization. In: Zlateva, T., Goleva, R. (eds) 18th EAI International Conference on Computer Science and Education in Computer Science, CSECS 2022, Virtual, Online, 24 June 2022-27 June 2022. Lecture Notes of the Institute for Computer Sciences, Social-Informatics and Telecommunications Engineering (LNICST), vol 450. Springer, Cham, pp. 92-101. (Scopus, SJR 2021: 0,185)

4. Yanev N., Traykov M., Milanov P., Yurukov B., 2018. A new classifier for protein fold class recognition. C. R. Acad. Bulg. Sci., vol. 71(7), pp. 885-892. (Impact Factor: 0.27, Scopus: SJR(0.205))
5. Trenchev I., Traykov, M., Mavrevski, R., Popchev, V., 2018. Investigation of the relationship between the hydrophobicity of an amino acid and codon, which shall encodes. WSEAS Transactions on Systems and Control, vol. 13, pp. 401-408, E-ISSN: 2224-2856. (Scopus: SJR(0.157))
6. Mavrevski, R., Traykov, M., Trenchev, I., Trencheva, M., 2018. Approaches to modeling of biological experimental data with GraphPad prism software. WSEAS Transactions on Systems and Control, vol. 13, pp. 242-247, E-ISSN: 2224-2856. (Scopus: SJR(0.157))
7. Mavrevski, R., Traykov, M., 2019. Visualization software for Hydrophobic-Polar protein folding model. Scientific Visualization, vol. 11(1), pp. 11-19, (Scopus: SJR(0.268))
8. Mavrevski, R., Traykov, M., Trenchev, 2019. Finding the shortest path in a graph and its visualization using C# and WPF. International Journal of Electrical and Computer Engineering (IJECE), vol. 10(2), pp. 2054-2059. (Scopus: SJR(0.322))

Group of indicators D: Citations in scientific journals, monographs, collective volumes and patents, referenced in world-known databases of scientific information (Web of Science and Scopus)

- 11 citations are presented in publications referenced and indexed in world-renowned scientific information databases (Scopus)*. The total number of points with the corrections for 4.6 is 88.

Group of indicators ZH:

- Chief Ass. Prof. Traykov has presented activities for 80 points related to his work as a leader of a student team for the programming Olympiad, membership in USB, translation of a book on competitive programming, improvement of courses at NBU, etc.

Group of indicators Z:

- The total number of points is 110 based on the author's study materials and high evaluation by the students, preparing reviews of diploma theses, participation in committees on diploma defences, teaching a foreign language, etc.

Group of indicators I:

- The total number of points is 55, including regular participation in the meetings of the departmental council, the program board of the Department of Informatics, etc.

General characteristics of the candidate's scientific works and achievements

A reference in NACID shows that Metodi Traykov obtained a PhD degree in 4.6. Informatics and computer sciences, diploma No: 292 / 11.09.2017 from Southwest University "Neofit Rilski". The topic of the dissertation is: "Mathematical models and algorithms for predicting the spatial structure of proteins". He has gained experience in a number of national (mostly at FNI) and international scientific projects (INTERREG, INTERACR), as well as during his work at Southwest University "Neofit Rilski" (YUZU) and New Bulgarian University (NBU).

It should be noted the multidisciplinary nature of the presented publications from Chief Ass. Prof. Metodi Traykov, covering bioinformatics, biology, informatics, as well as issues related to physical chemistry, computational chemistry, mathematical modelling, optimization, etc. The in-depth knowledge and contributions of the candidate in the field of bioinformatics can be judged from the presented habilitation thesis and scientific publications, incl. the available articles in Scopus, WoS and their citations. A review in Scopus shows that M. Traykov has co-

authored publications with researchers from NBU, YOZU, IMI-BAN, Sofia University "St. Kl. Ohridski", UNIBIT, as well as with researchers from Canada and Italy.

M. Traykov expertise in informatics is evidenced by his teaching experience and his role in preparing students for participation in national programming Olympiads, as well as in the preparation of tasks for 4 consecutive Olympiads (2019-2022).

The analysis of the candidate's scientific works shows that:

a) the scientific works meet the minimum national requirements and the requirements of the NBU for holding the academic position "Associate Professor";

M. Traykov's high scientific achievements are evidenced by his profiles in Web of Science with h-factor 4 based on 8 publications and 29 citations, and in Scopus with h-factor 5 based on 17 publications and 93 citations.

The scientific research and publications of Chief Ass. Prof. M. Traykov are mainly in the field of bioinformatics, biology, informatics, as well as issues related to physical chemistry, computational chemistry, mathematical modelling, optimization, etc.

2. Characteristics and evaluation of the teaching activity of the candidate

The professional biography of Chief Ass. Prof. M. Traykov includes a wide range of activities in the field of bioinformatics.

Chief Ass. Prof. M. Traykov has a serious scientific and teaching experience. The candidate held the academic position of "Assistant Professor" at Southwest University "Neofit Rilski" and New Bulgarian University. In 2020, after a competition in direction 4.6. Informatics and computer sciences was appointed as a "Chief Assistant Professor" at the Informatics Department of the New Bulgarian University. Since 2019, he has been Assistant Professor at the Department of Computer Sciences, American University in Bulgaria.

At NBU, M. Traykov gives lectures in Bulgarian and English on various subjects: Introduction to algorithms and programming, Programming, Data structures, Competitive programming, Bioinformatics, Discrete mathematics, etc.

3. Content analysis of the scientific and applied research achievements of the candidate contained in the materials for participation in the competition

The scientific and applied research contributions of the candidate are as follows:

- An overview of algorithms and techniques for predicting the natural structure of proteins, an overview of mathematical models for studying the genetic code and a comparative analysis of protein folding algorithms were made;
- Mathematical modelling, optimization theory, non-linear regression analysis, etc. have been innovatively applied in various publications and other methods for conducting various numerical experiments and analyses in biology;
- An approach for selecting an optimal model for the protein folding problem is presented, and the selected model is verified through a number of computational experiments;
- A model was developed describing the nucleotide sequences at different levels of protein evolution;
- A mathematical analysis of the construction of the protein structure and a possible evolutionary scenario for a given protein was made;

- Software was developed to visualize the numerical results for the protein folding problem;
- An algorithm and a program were designed, allowing drawing an undirected graph, visualizing the shortest path between two vertices in this graph and finding its value.
- A variety of numerical experiments were conducted with optimization programs using various mathematical models.

4. Critical remarks and recommendations

I recommend the candidate to take action to acquire international and cross-sectoral experience, as well as experience as a supervisor of graduate and doctoral students, so that he can form his scientific group in the future.

5. Conclusion on the application

After getting acquainted with the materials and scientific papers presented in the competition and based on the analysis of their significance and the scientific and applied research contributions contained in them, **I confirm** that the achievements meet the requirements of ZRASRB, its Implementing Regulations and relevant Regulations of the NBU for holding the academic position of "Associate Professor". The candidate fully satisfies the minimum national requirements in the professional field.

I give my **positive assessment** of the candidacy.

Based on the above, I recommend the scientific jury to propose to the competent body of the NBU to choose Metodi Traykov to take the academic position of "Associate Professor" in the professional field **4.6. "Informatics and Computer Science"**.

21.02.2023 г.

Prepared opinion:

Assoc. Prof. Elissaveta Gourova