# O P I N I O N

in the field of higher education 4. “Natural Sciences, Mathematics, and Informatics,”
Professional field 4.3. “Biological Sciences,”
Scientific speciality “Molecular Biology,” for the competition for the academic position of “Associate Professor” for the needs of the Institute of Molecular Biology “Acad. Roumen Tsanev” – BAS, announced in State Gazette No. 24 of 21.03.2025.

## AUTHOR OF THE OPINION

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*appointed by order of the Director of the IMB-BAS No. 64-OB/31.03.2025,*

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### GENERAL INFORMATION

The competition for the academic position of “Associate Professor” in the “Regulation of Gene Activity” section of the IMB-BAS has only one candidate – Chief Assistant Professor Kiril Todorov Kirilov, PhD. All required documents for participation in the competition have been submitted following the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), its implementing regulations, and the specific requirements of the IMB-BAS. Detailed lists of scientific output, citations, patents, evidence of project and teaching activities, as well as copies of the publications submitted for the competition, have been provided. The scientific works are within the field of the announced competition and do not duplicate materials used for obtaining the PhD degree.

### BRIEF BIOGRAPHICAL DATA OF THE CANDIDATE

Dr. Kirilov was born in 1974 in the town of Slivnitsa. In 2001, he obtained a Master’s degree in “Biotechnology Engineering” from the University of Chemical Technology and Metallurgy – Sofia. In 2014, he defended his PhD thesis on “Codon Usage in Bacteria and Animal Mitochondria” at IMB-BAS. His professional career has been entirely connected to IMB-BAS, where he has worked in the “Regulation of Gene Activity” section since 2007, progressing through the positions of Specialist, Research Associate III, and Chief Assistant Professor.

His scientific career includes specialisations at the International Centre for Genetic Engineering and Biotechnology (ICGEB) – Trieste, Italy, and at Carleton University – Ottawa, Canada. In addition to his active research work, Dr. Kirilov has substantial university teaching experience at the Technical University of Sofia and the

New Bulgarian University, delivering lectures and practical classes in bioinformatics, bacterial genetics, and related disciplines.

## SCIENTIFIC CONTRIBUTIONS

The scientific output of Chief Assistant Professor Kiril Todorov Kirilov is characterised by multidisciplinarity, originality, and a clear focus on current and socially significant scientific problems. An essential part of his research is devoted to computer-aided drug discovery and therapeutic design. In this area, he integrates modern *in silico* approaches – molecular docking, virtual screening, ADME-Tox analyses, and quantum-chemical calculations – to identify and optimise molecules with potential biological activity against socially significant diseases, including Alzheimer's, Parkinson's, and COVID-19. Particularly valuable are his results in the development of hybrid molecules with enhanced AChE-inhibitory and antioxidant activity, as well as in the drug repurposing of already known compounds for new therapeutic applications.

His research in the field of genomics, codon usage, and regulation of the translation process is also noteworthy. Through a systematic analysis of 158 prokaryotic genomes covering a broad taxonomic range, he investigated the relationship between codon structure and gene expression levels. These results are of significant importance for understanding fundamental mechanisms in molecular biology and lay the foundation for future bioengineering applications.

A significant focus of Dr. Kirilov's work is the study of glycosylation processes of biomacromolecules and the identification of novel enzymatic functions. For the first time, he has identified the deglycosylating activity of the enzyme phosphoglucose isomerase and investigated its *in vivo* significance. In parallel, biochemical factors that enhance or suppress glycosylation processes have been identified, with direct relevance to the development of anti-ageing strategies and novel therapeutic approaches.

His contribution to bioinformatics software design is also substantial. Dr. Kirilov has developed algorithms and applications such as "Gene Triplet Analysis" and "DNA Size Finder," which automate the analysis of complex experimental data and are freely available to the scientific community. These tools increase the efficiency and reproducibility of scientific research.

His scientific work extends to applied and educational initiatives. Dr. Kirilov is a co-author of two patented kits for practical training in chemistry and environmental protection, aimed at supporting STEM education and fostering student interest in the natural sciences.

## SCIENTIFIC INDICATORS OF THE CANDIDATE

The report on meeting the minimum national requirements and those of IMB-BAS shows that Dr. Kirilov fully meets and, in some cases, exceeds the required values in all indicator groups. For **Indicator A**, he receives 50 points for the defended PhD thesis – exactly as required. **Indicator B** is fulfilled with a total of 100 points from five publications, equivalent to a habilitation work – three in Q1-ranked journals, one in Q3, and one in a non-IF publication indexed in Scopus with SJR.

**For Indicator G**, Dr. Kirilov achieves the required 220 points through seven original scientific publications, three book chapters, and two patents. Of the seven publications, one is in Q1, two in Q2, and four in Q3 journals, with their contribution further enhanced by the books and patents. **Indicator D** is fulfilled with 60 points, secured by 30 citations in peer-reviewed journals indexed in global databases.

**Quantitatively, the candidate's total score amounts to 480 points**, exceeding both the national minimum requirements and the IMB-BAS criteria for the academic position of "Associate Professor." These scientific indicators, combined with the high quality and applicability of his scientific work, confirm his scientific maturity and potential for future achievements.

Dr. Kirilov has a long-standing and consistent teaching record, complementing his scientific profile and demonstrating his ability to transfer knowledge and prepare the next generation of specialists. Between 2014 and 2021, he taught bioinformatics (lectures and exercises) in four faculties of the Technical University of Sofia, training students from different specialities and adapting the content to their needs. From 2022 to 2024, he was a lecturer at the New Bulgarian University, where, in addition to his core course in bacterial genetics, he taught at least six additional disciplines in molecular biology and biotechnology.

In parallel, he is actively involved in project work at IMB-BAS, participating in five national research projects funded by the National Science Fund and the Ministry of Education and Science. Within these projects, Dr. Kirilov contributed both his bioinformatics expertise and the development of applied solutions, demonstrating his ability to work effectively in multidisciplinary teams and to deliver scientific value combined with practical applicability.

**CONCLUSION**

Chief Assistant Professor Kiril Todorov Kirilov presents a substantial, original, and applicable body of scientific work with clear contributions to current areas of molecular biology and bioinformatics. His profile, scientific indicators, and academic activities fully meet the requirements for the academic position of "Associate Professor."

*On this basis, I kindly recommend that the esteemed Members of the Scientific Jury and the Scientific Council of IMB-BAS vote in favour of electing Chief Assistant Professor Kiril Todorov Kirilov as "Associate Professor" in professional field 4.3. "Biological Sciences," scientific speciality "Molecular Biology."*

10 August 2025,

Sofia, Bulgaria

Prepared by: _____

/Prof. Milena Georgieva, PhD/