Opinion

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About a competition for the Academic position "Associate Professor" in the area of Higher Education 4. "Natural Sciences, Mathematics and Informatics", professional field 4.3. "Biological Sciences" (Molecular Biology) for the needs of the “Regulation of Gene Activity” Department at the Institute of Molecular Biology “Acad. Roumen Tsanev” – Bulgarian Academy of Sciences (IMB-BAS), announced in the State Gazette, issue 24/21.03.2025

The only candidate in the competition for "Associate Professor" is a Senior Assistant Professor Kiril Todorov Kirilov, PhD. The review of the submitted documents shows that the procedure for opening and conducting the competition has been followed as the documents have been prepared in accordance with the requirements of the Academic Staff Development Act in the Republic of Bulgaria, the Regulations for its implementation and the Regulations for Development of the Academic Staff (RDAS) at IMB. The candidate has submitted the full set of required documents in an orderly and logical manner.

Professional Development

Kiril Kirilov graduated with a Master’s degree in “Engineer in Biotechnology” from the University of Chemical Technology and Metallurgy in 2001. In 2014, he obtained his PhD degree in “Molecular Biology” at IMB-BAS with the thesis “Codon Usage in Bacteria and Animal Mitochondria.” His academic career began in 2007 as a specialist at IMB-BAS, followed by assistant professor in 2009, and promotion to Senior Assistant Professor in 2011. Between 2014 and 2021, Dr. Kirilov was a part-time lecturer at the Technical University of Sofia, delivering lectures and practicals in Bioinformatics. In 2021, he taught “Bacterial Genetics” at New Bulgarian University, and from 2022 to 2024, he held the position of Senior Assistant Professor at the Department of Natural Sciences of the same university. He has completed two research specializations abroad – at the International Centre for Genetic Engineering and Biotechnology in Trieste, Italy, and at Carleton University in Ottawa, Canada. The candidate was also coordinator of the FEBS course “Sofia School of Protein Sciences: Structure and Dynamics of Biological Macromolecules.”

Research Activity
The scientific work of Dr. Kirilov focuses primarily on the integration of computational bioinformatics methods in the development of therapeutic agents, codon usage in prokaryotic and mitochondrial genomes, and the development of novel algorithms and software for specialized automated DNA image analysis.

To date, Dr. Kirilov has 25 scientific publications (indexed in Web of Science and Scopus), including 9 in impact factor (IF) journals, 13 in SJR-ranked journals, and 3 book chapters. He has presented 2 patents and 2 popular science publications aimed at disseminating scientific knowledge to the public.
Of the 25 publications, 21 are in quartile-ranked journals: 4 – Q1, 4 – Q2, 11 – Q3, and 2 – Q4. The total IF is approximately 42, with over 90 citations and an h-index of 6. Dr. Kirilov is first author on 5 publications.

For the competition, the candidate submitted 12 scientific articles, all published in peer-reviewed journals. The quartile distribution is: 4 – Q1, 2 – Q2, 5 – Q3, and 0 – Q4 (total of 11 quartile-ranked publications). There is also 1 SJR publication, 3 book chapters, and 2 patents.

According to the compliance report with the minimum requirements, the section "Habilitation Work" includes 5 scientific papers (4 with IF, 1 SJR). For criteria B (100/100), G (220/220), D (60/60), and E (50/not required), the candidate fully meets the points required by the IMB-BAS rules for the position of "Associate Professor." His publications appear in high-IF journals such as European Journal of Medicinal Chemistry (IF 7.1), Nephrology Dialysis Transplantation (IF 6.1), and Journal of Alzheimer's Disease (IF 4.5).

Dr. Kirilov has participated in 4 research projects funded by the Bulgarian National Science Fund and 1 research-educational project from 2014 to the present.

Teaching Activity
Since 2014, Dr. Kirilov has been actively engaged in teaching alongside his research career. He has taught Bioinformatics to students in multiple faculties at the Technical University of Sofia and later (2021) joined New Bulgarian University (NBU) as a lecturer in Bacterial Genetics. Between 2022 and 2024, he was a Senior assistant professor in the Department of Natural Sciences at NBU. He is co-author of an educational kit for chemistry and environmental protection for primary and secondary schools, designed to improve teaching quality and stimulate students' interest in science.

Scientific Contributions

Dr. Kirilov's research integrates computational bioinformatics with experimental methods for the discovery, design, and preclinical evaluation of novel therapeutic agents, as well as the study of fundamental biochemical and molecular processes. His main fundamental and applied-oriented contributions are in the following fields:

- **Computer-Aided Drug Design (CADD)**: Development and application of *in silico* methods (molecular modeling, docking analysis, quantum-chemical calculations, ADME-Tox profiling) for designing galantamine derivatives (anti-AChE activity for Alzheimer's), neuropeptide ligands (neuroprotection in Parkinson's), and antiviral molecules against SARS-CoV-2, including drug repurposing. Bibliometric analyses (VOSviewer, Web of Science, specialized tools like DATAN V.5 and PAMPA Explorer) for mapping nutraceutical research output.
- **Genomic Bioinformatics**: Development of the Gene Triplet Analysis (GTA) software for quantitative analysis of codon frequency and context in prokaryotic and mitochondrial genomes. Large-scale analysis of 158 bacterial genomes identifying codon usage patterns and experimentally confirming their influence on translation efficiency in E. coli.
- **Automated Biological Image Analysis**: Development of the DNA size finder algorithm and application for high-throughput and objective analysis of DNA fiber labeling (open-source).
- **Applied Bioinformatics in Cell Biochemistry and Microbiology**: Discovery of a novel deglycation function of the glycolytic enzyme phosphoglucose isomerase (Pgi) in *E. coli*, evaluation of anti-glycation agents, demonstration of DNA-targeting activity of allenic acids, and characterization of glycation-induced aging in bacterial models.
- **Gene Expression and Biotechnology**: Demonstration that 3′-end truncations of the human interferon-gamma gene affect the stability of expression plasmids; development of a quantitative model to predict plasmid loss.
- **Applied Bioinformatics in Oncology**: Development of a conceptual *in silico* model for integrated analysis of multimodal medical and molecular data in breast cancer, with potential applications in precision medicine.

These contributions combine theoretical, experimental, and applied research, with an interdisciplinary scope and significant potential for future applications in biopharmaceuticals, genomics, microbiology, and medicine.

Personal Impressions

Throughout his professional development, Dr. Kiril Kirilov has established himself as a highly qualified and responsible scientist and lecturer, consistently willing to share his knowledge and skills with colleagues, the broader scientific community, and the public.

Conclusion

Based on the above, I conclude that the substantial contributions of the candidate's scientific works, their impact in the literature, and his clearly defined research profile qualify Senior Assistant Professor Dr. Kiril Todorov Kirilov as a highly competent and established scientist in the field of bioinformatics and molecular biology. The candidate meets all requirements for the position of "Associate Professor" in the area of higher education 4. "Natural Sciences, Mathematics and Informatics," professional field 4.3. "Biological Sciences," scientific specialty "Molecular Biology," for the needs of the "Regulation of Gene Activity" Department at IMB-BAS.

Therefore, I recommend that the Scientific Jury propose to the Scientific Council of IMB-BAS to award Senior Assistant Professor Kiril Todorov Kirilov, PhD the academic position of "Associate Professor."

10.08.2025 /Prof. Galya Staneva, PhD/