

REVIEW

on the competition for the academic position of Professor

Field of higher education 4. Natural Sciences, Mathematics and Informatics

Professional field 4.6. Informatics and Computer Science

Scientific specialty: Informatics (Cognitive Models and Artificial Intelligence for Multimedia Data)

Competition	for the needs of the Mathematical Linguistics Department, Institute of Mathematics and Informatics – BAS; announced in State Gazette, issue 54 of 12 June 2026
Candidate	Associate Professor Alexander Iliev Iliev, PhD
Reviewer	Professor Krassen Stefanov Stefanov, PhD, Faculty of Mathematics and Informatics, Sofia University “St. Kliment Ohridski”
Basis	member of the Scientific Jury and reviewer appointed by Minutes No. 1 of 14 August 2026

1. General Overview of the Procedure and the Candidate

This review has been prepared on the basis of the complete set of documents submitted for the competition, the applicable statutory provisions and the internal rules of the Bulgarian Academy of Sciences (BAS) and the Institute of Mathematics and Informatics at BAS (IMI-BAS), the candidate's lists and reference statements, as well as the full texts of the submitted scientific publications, monographs, textbooks and other materials. At its first meeting on 14 August 2026, the Scientific Jury admitted the candidate to evaluation.

Associate Professor Alexander Iliev Iliev, PhD, is the sole candidate in the competition. He holds a doctoral degree for the dissertation “Emotion Recognition Using Vocal and Prosodic Parameters”, defended in 2009 at the University of Miami and recognized in Bulgaria. He has worked at IMI-BAS since 2014, initially as Chief Assistant Professor and, since 2017, as Associate Professor. The submitted certificate of employment confirms that, as of 1 August 2026, he has a total length of service of 11 years, 3 months and 9 days, including 8 years and 8 months in the academic position of Associate Professor at IMI-BAS. Thus, the requirement for at least two academic years of service as an Associate Professor is met by a substantial margin.

The candidate's professional profile is international and combines research, teaching and applied work. In addition to his position at IMI-BAS, he is a Professor and Academic Director of the “Big Data and Artificial Intelligence” programme at SRH University of Applied Sciences, Berlin, a lead instructor at the University of California, Berkeley, and has held a teaching position at the University of Wisconsin–Stevens Point. His earlier professional experience includes engineering and product-development work at the University of Miami, Sony/Gracenote and Time Warner-bTV. This combination is relevant to the subject of the competition because it supports the transfer of research results to real software and information systems.

2. Compliance with Statutory and Institutional Requirements

Under Article 60 of the Rules for the Implementation of the Development of Academic Staff in the Republic of Bulgaria Act (ZRASRB), a candidate for the academic position of Professor must hold the educational and scientific degree of Doctor, have the required academic or professional experience, submit a monographic work or equivalent publications that do not duplicate works used in previous academic procedures, present other original scientific and applied-scientific results, satisfy the minimum national and institutional requirements, and have no plagiarism established in accordance with the statutory procedure. On the basis of the submitted documents, these prerequisites are fulfilled. A declaration of originality has also been submitted, and the competition materials contain no information indicating established plagiarism.

The internal rules of IMI-BAS specify minimum values for the groups of indicators applicable to the academic position of Professor in professional field 4.6, together with the specific requirement that the candidate have at least 12 publications in sources with an Impact Factor (IF) or SCImago Journal Rank (SJR). At least half of the required number of publications must have been published or accepted after the candidate's most recent procedure for acquiring an academic degree or position.

Group	Minimum for Professor	Reported by the candidate	Assessment
A	50	50	fulfilled
V	100	130	fulfilled (+30)
G	220	444	fulfilled (+224)
D	140	228	fulfilled (+88)
E	150	280	fulfilled (+130)

Table 1. Compliance with the minimum quantitative requirements according to the submitted reference statement.

The quantitative requirements are fulfilled in all indicator groups. The margins above the minimum are particularly substantial in Groups G, D and E. For Group V, the candidate uses publications equivalent to a habilitation thesis, including an article in IEEE Internet of Things Journal and an article in Applied Sciences, as well as two indexed publications in established Springer series. This is an appropriate approach because the assessment of scientific suitability does not depend on whether the two new monographs are accepted as the sole basis for the habilitation-equivalent requirement.

The specific IMI-BAS requirement of at least 12 publications with IF or SJR is also fulfilled. The statement on the minimum requirements reports 14 such publications. This number exceeds the institutional minimum. According to the list of works, substantially more than the required six publications appeared after 2017, i.e. after the candidate's most recent procedure for appointment to an academic position.

The submitted list clearly distinguishes the publications used for the doctoral degree and for the competition for Associate Professor from the works submitted in the present competition. I did not identify any work from the previous Associate Professor procedure among the 23 competition publications. This is

important for satisfying the requirement that the scientific output submitted in the present procedure must not duplicate that used in previous procedures.

3. Scope, Structure and Quality of the Scientific Output

The complete list of scientific works contains 66 items. According to the submitted reference statement, 43 publications are indexed in Web of Science and/or Scopus, and 29 appear in sources with IF and/or SJR. For the present competition, the candidate has submitted two monographs, four university textbooks, one chapter in a scientific book, one registered utility model and 23 scientific publications. In 14 of the competition papers the candidate is first author, and in 9 he is second author. This authorship profile, together with the separate statement describing individual contributions, indicates substantial personal involvement in the submitted research.

The scientific output covers a broad thematic range. The central and longest-standing research line concerns speech and audio signal analysis, emotion recognition, personalization and recommender systems. In recent years this has been extended to deepfake detection and explainable AI, large language models, Big Data/IoT architectures, RAG systems, autonomous systems and applied predictive models. This breadth is an advantage in terms of applicability, although it also creates a risk of thematic fragmentation. For the purposes of this competition, I regard “AI/ML for multimedia and heterogeneous data” as the defining core around which a large part of the candidate’s results can be coherently grouped.

The quality of the publication venues is heterogeneous. There are strong recent papers in international journals, including IEEE Internet of Things Journal (Q1 according to the submitted statement) and Applied Sciences (Q2), as well as publications in indexed ACM, IEEE and Springer proceedings. At the same time, a substantial share of the works appears in conference proceedings and series with more modest SJR values or quartile positions. Accordingly, the publication profile is stronger in volume, international reach and thematic activity than in concentration within a small number of top-ranked archival venues. A positive trend is the presence of stronger journal publications in the most recent period.

4. Assessment of the Main Scientific and Applied-Scientific Contributions

4.1. Speech, Emotion and Multimedia Data Analysis

This research line is most directly connected both with the candidate’s doctoral training and with the subject of the competition. The submitted works investigate glottal and prosodic features, feature robustness under noise, cross-cultural and multilingual emotion recognition, and the use of emotional information for personalization and recommendation. A significant result is the demonstration that glottal symmetry can carry a robust emotional signal under different noise conditions, together with the development of approaches that combine speech analysis with text processing and content recommendation.

The cross-lingual and cross-cultural studies use corpora in different languages and neural models in an attempt to distinguish universal from culture-dependent characteristics. The contribution here is primarily experimental and methodological: selection and extraction of relevant acoustic features, comparative experimental design, and validation of models on heterogeneous data. The chapter “Emotion Detection Using Speech Analysis and Deep Learning” is predominantly systematic in character and is valuable as a synthesis of methods, limitations and directions for further development rather than as an independent experimental result.

Particularly relevant to the topic of the competition is the connection between perception, emotional state and automated decision-making in content discovery and recommendation systems. Here, the candidate consistently develops the progression from signal analysis toward intelligent system behaviour, allowing the results to be interpreted as a contribution to cognitively oriented models for processing multimedia data.

4.2. Intelligent Systems, LLMs, XAI, Deepfakes and Security

A second strong research line concerns the reliability and security of contemporary AI systems. The paper “Bias Detection and Mitigation in Large Language Models for Code Generation” proposes an integrated methodology combining contextual code analysis, counterfactual prompting and reinforcement learning with human feedback to detect and reduce bias in LLM-generated code. The reported experimental evaluation shows an approximately 49% reduction in the measured bias while preserving functionality. I regard this result as current and methodologically significant because it addresses the reliability of generative AI at the level of program code rather than only at the level of textual content.

Several complementary results are presented in the area of deepfake detection. The paper “Explainable AI for DeepFake Detection” compares ResNet-50, Inception V3 and VGG-16, and augments classification with network dissection in order to explain the internal features leading to a decision. The reported F1 values, approximately in the range 0.8–0.9, demonstrate the practical viability of the approach. The scientific contribution lies in integrating detection and explainability and in experimentally demonstrating that model transparency can be treated as part of system reliability.

This research line also includes work on the detection of manipulated content, fake reviews and digital forensics. Some of the contributions are integrative, combining established architectures, feature selection, transfer learning and interpretability methods. I would therefore classify them predominantly as applied-scientific contributions rather than as introducing fundamentally new theory. This does not reduce their relevance to a competition in Informatics with a clear applied dimension.

4.3. RAG, Big Data, IoT and Intelligent Infrastructures

A third research direction covers architectures for Big Data, IoT and RAG systems. The registered utility model “Big Data Processing System” proposes a configurable hybrid architecture combining characteristics of the Lambda and Kappa approaches and enabling adaptation between processing modes. Its applied-scientific value lies in integrating data collection, processing, storage and visualization within a scalable infrastructure and in targeting real streaming and batch workloads.

The paper on secure curation and reuse of digital scientific data through Retrieval-Augmented Generation addresses semantic retrieval, personalization and secure access to sensitive data, using an architecture that combines RAG with data-protection approaches. This work extends the candidate’s profile from the analysis of individual modalities toward intelligent information infrastructures operating on heterogeneous data and generative models.

4.4. Applied Models for Prediction and Analysis

The competition materials also include results on the prediction of real-estate prices, cryptocurrencies, health risks, autonomous vehicles and other applied problems. These demonstrate solid command of contemporary machine-learning tools and the ability to work across different application domains. At the same time, these publications are more peripheral to the specific wording “Cognitive Models and Artificial Intelligence for Multimedia Data”. In evaluating them, I therefore place greater weight on their role as

evidence of broad methodological competence and practical application than as a core scientific line of the competition.

5. Monographs and Teaching Publications

The candidate has submitted two monographs from 2026. The first, “AI Popular Systems. Architecture, Capabilities, and Comparative Analysis”, systematizes contemporary generative AI systems through a common comparative framework covering architecture, capabilities, integration, scalability, transparency, ethical aspects and practical use. Its main value lies not in describing individual products, but in imposing uniform criteria that allow architectural choices and their implications for usability and applicability to be compared.

The second monograph, “Practical Benchmarking and Hands-On Evaluation of AI Popular Systems”, is more experimentally oriented. Different AI systems are placed under comparable conditions and are required to solve identical machine-learning tasks, including generation and debugging of TensorFlow/Keras code, evaluation using accuracy/loss, confusion matrices, ROC and precision–recall analysis, hyperparameter optimization and cross-validation. I regard the common benchmark design and the detailed documentation of the interactions, which supports reproducibility, as its strongest contribution.

Both monographs address an exceptionally dynamic technological field. Consequently, some specific product characteristics will inevitably become outdated rather quickly. Their lasting scientific value depends on the extent to which the general comparative criteria and experimental protocol remain applicable independently of the version of a particular model. In this respect, I assess Monograph A primarily as an analytical and systematizing work, and Monograph B as a methodological and experimental comparative study.

Four textbooks are submitted: two on AI and smart systems design, and two on Python, machine learning, deep learning, transfer learning and AI engineering. They are accompanied by official statements documenting their use in courses at SRH University. The minutes of the first meeting of the Scientific Jury note that the relationship between the publication dates of the printed editions and the documented use of the materials in the teaching process was discussed; after this discussion, the candidate was admitted to evaluation. I accept these materials as evidence of substantial teaching and methodological activity. In terms of content, the textbooks are closely aligned with the courses taught by the candidate and support his profile as an educator in AI and data science.

6. Citations and Scientific Impact

The candidate’s overall reference statement reports 37 cited publications and 310 citing sources. These figures reflect his complete publication record, including earlier research, and should not automatically be attributed only to the works submitted in the present competition. For Group D of the minimum requirements, 228 points are reported, corresponding to 38 recognized citations in indexed sources according to the attached statement. The minimum requirement of 140 points is exceeded by a substantial margin.

The citations are distributed across results on speech emotion, smart ecosystems, recommender systems, digital ecosystems and other topics. This indicates international visibility of the candidate’s scientific profile, although the impact is uneven across the individual research directions. For the most recent publications from 2025–2026, it is still too early to expect a stabilized citation record.

7. Teaching, Project, Expert and Applied Activities

Teaching is one of the strongest dimensions of the candidate's professional profile. Since 2012, he has taught at the University of California, Berkeley, including courses in scientific computing, Python, data analysis, machine learning and deep learning. From 2017 to 2019 he taught at the University of Wisconsin–Stevens Point, and since 2019 he has been a Professor at SRH University of Applied Sciences, Berlin, where he serves as Academic Director of the Master's programme "Big Data and Artificial Intelligence" and teaches courses in machine learning, AI use cases, Python for AI, big data and cybersecurity. This is sustained and internationally verifiable teaching activity that significantly exceeds the formal minimum.

Under Group E, the candidate reports participation in two national and five international research projects, including ENACT, OpenAIRE Advance, BOWI, Cross4Health and WE-TRANSFORM, together with the four textbooks; the total is 280 points against a required minimum of 150. The supplementary statement also documents participation in other international initiatives, editorial and reviewing activities, project evaluation and organizational work. This demonstrates good integration into international scientific and professional networks.

The candidate's role as principal investigator of major research projects and as supervisor of successfully defended doctoral dissertations is documented less strongly. No such indicators are claimed in the submitted point-based statement. Academic leadership of a Master's programme and work with students are unquestionably positive, but for the future development of a Professor's profile at BAS I would recommend a stronger emphasis on building an independent research group, supervising doctoral candidates and taking a leading role in competitive research projects.

The applied orientation is further supported by the utility model for Big Data processing registered in 2025 and by earlier US patents listed in the curriculum vitae. Although the latter are not claimed for points in the present competition, they provide context for a sustained interest in transferring scientific ideas into technical solutions.

8. Critical Remarks and Recommendations

My critical remarks do not concern formal compliance with the requirements; rather, they are intended to support the further development of the candidate's scientific profile:

- The scientific output is thematically broad. For greater recognizability, future research would benefit from stronger concentration around a clearly defined core—multimodal AI, cognitively oriented analysis, and reliable/explainable intelligent systems—rather than being distributed across numerous only loosely connected application domains.
- A substantial part of the publications appears in conference proceedings and series with moderate or low bibliometric indicators. The profile would benefit from a larger share of publications in leading Q1/Q2 journals and selective international conferences with high scientific standing.
- For some of the works, the stated contributions are primarily integrative or comparative. In future publications it would be desirable to distinguish even more clearly among a new algorithm/model, a new experimental protocol, and engineering integration of established methods, and to employ more rigorous ablation studies, statistical-significance testing and cross-dataset validation where applicable.

- The monographs devoted to specific generative-AI systems are exposed to rapid technological obsolescence. Maintaining reproducible benchmark artifacts, versioned data/prompts and periodically updated experiments would increase the long-term scientific value of this type of work.
- No substantial portfolio of successfully supervised doctoral graduates or international research projects led by the candidate as principal investigator has been presented. This is a natural next area for development upon appointment to the academic position of Professor.

These remarks do not alter my overall positive assessment. They identify areas in which the candidate can transform his extensive international teaching and applied experience into an even more focused and visible research school.

9. Overall Assessment

The submitted materials show sustained development from the candidate's earlier research on speech and audio signals toward contemporary artificial-intelligence problems. His most significant strengths are: long-standing work on speech and emotion analysis; solid methodological expertise in machine learning and deep learning; an ability to integrate different modalities and information sources; active work on current topics such as LLMs, bias, XAI, deepfakes and RAG; substantial international teaching activity; and a clear orientation toward practical implementation.

The scientific results display varying degrees of originality, ranging from independent methodological and experimental contributions to systematizations and engineering integrations. Taken together, however, they form a sufficiently substantial and recognizable profile for the academic position of Professor. It is particularly important that the formal criteria are not met only marginally: the candidate exceeds the required thresholds substantially in Groups G, D and E, satisfies the specific requirement for publications with IF/SJR, and submits new scientific output distinct from that used in previous academic procedures.

In view of the nature of the competition, I find the connection between Associate Professor Iliev's leading research line and "Cognitive Models and Artificial Intelligence for Multimedia Data" convincing. Some of the more recent works extend beyond a narrow multimedia focus, but they broaden the methodological basis toward reliable and explainable AI, big-data processing and generative models. This is acceptable and, to a considerable extent, beneficial for the further development of this topic at IMI-BAS.

10. Conclusion

After analyzing the submitted documents and scientific works, I conclude that Associate Professor Alexander Iliev Iliev, PhD, satisfies the requirements of ZRASRB, the Rules for its implementation, the regulations of BAS, and the additional requirements of IMI-BAS for appointment to the academic position of Professor in professional field 4.6. "Informatics and Computer Science". The candidate has the required academic experience, sufficient and new scientific output, demonstrated citation impact, substantial international teaching activity, and applied-scientific results. His scientific contributions are relevant to the subject of the competition and demonstrate an ability to develop research directions independently and to apply contemporary AI methods to multimedia and heterogeneous data.

For the reasons stated above, I give a POSITIVE ASSESSMENT and recommend that the Scientific Jury propose to the Scientific Council of the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences that Associate Professor Alexander Iliev Iliev, PhD, be appointed to the academic position of Professor in professional field 4.6. "Informatics and Computer Science", scientific specialty Informatics (Cognitive Models and Artificial Intelligence for Multimedia Data).

Date: 2026

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