OPINION
on the competition for the acquiring academic position "Professor"

Area of Higher Education	4. Natural Sciences, Mathematics, and Informatics
Professional Field:	4.6. Informatics and Computer Science
Scientific Specialty:	Informatics (Data Protection, Internet of Things)
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For the needs of:	Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences (IMI-BAS)
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Member of the Scientific Jury in accordance with:	Order No. 348 / 01.10.2024 by the Director of IMI

Only one candidate has submitted documents for participation in the announced competition:

Assoc. Prof. Hristo Nikolov Kostadinov, Ph.D.

I. GENERAL DESCRIPTION OF THE SUBMITTED MATERIALS

1. Application Details

Assoc. Prof. Hristo Kostadinov has submitted all required documents, lists, and records. To meet the minimum criteria for a position "Professor" at IMI-BAS, he has provided:

- Information about Ph.D. dissertation (achieving 50 points in Category A);
- 5 publications with SJR ranking and 1 indexed in zbMath (112 points, with the required minimum of 100 points in Category B);
- 3 articles with IF in Q1, 4 articles in SJR-ranked journals, and 2 articles indexed in Scopus (254 points, with the required minimum of 220 points in Category G);
- 24 citations in Scopus and/or WoS for 11 of his publications (144 points, meeting the required minimum of 140 points in Category D);
- Supervision of 1 Ph.D. student, participation in 7 national and 3 international scientific or educational projects. One of these projects ("150th Anniversary Science Fair of the Bulgarian Academy of Sciences" funded by the Program "Education with Science") is, in my view,

organizational rather than scientific or educational; however, even after eliminating this project, the points required for Category E are exceeded (170 points, with a required minimum of 150 points).

The requirement under Article 3, para 1, item 4 of the Regulations on the Conditions and Order for Acquiring Scientific Degrees and Occupying Academic Positions at IMI-BAS that at least 12 of the candidate's publications have IF or SJR is fulfilled.

The requirement of Article 3, para 3, stating that at least half of the total number of publications required in Article 3, para 1 should have been published after the date of appointment to the academic position, is also met. Hristo Kostadinov has held the position of "Associate Professor" since 15.10.2012, and all publications presented for the competition date after this period.

The publications, citations, and additional evidence for the various criteria have not been used to obtain either the Ph.D. degree or the "Associate Professor" position.

The candidate has over 11 years of experience as an Associate Professor at IMI, meeting the requirement under Article 29, para 1, item 2 of the Act on Development of the Academic Staff in the Republic of Bulgaria.

2. Content Analysis of the Candidate's Scientific and Applied Achievements

The most significant contributions of the candidate's submitted publications relevant to the competition's focus include:

A. Scientific Contributions:

- Development of new codes for correcting asymmetric errors in flash memories, using codes over a ring of integers modulo m.
- Determination of the exact value or estimation of the upper and lower bounds for the probability of symbol error in a Gaussian channel for a Triangular Quadrature Amplitude Modulation (TQAM) scheme.
- Investigation of the efficiency of coded modulation schemes in TQAM, based on codes over a ring of integers modulo m, for various constellation configurations.
- Algebraic construction of integer codes capable of correcting specific errors in binary communication channels, enhancing the theoretical basis for error correction.

B. Applied Scientific Contributions:

- Proposition of a practical method for selecting parameters for embedding watermarks in compression-resistant music audio files, using key-dependent modulation and Haar wavelet transformation.
- Successful application of modified Mixed Integer Linear Programming (MILP) models in cloud and fog platforms for dynamic allocation of containers and intermediate microservices.
- Design and implementation of an IoT application named EcoLogic for monitoring and controlling vehicle carbon emissions, validated through real-world testing.

– Development of a system for managing the software lifecycle, incorporating smart contract and distributed ledger technologies to improve communication security and transparency among stakeholders.

C. Practical Contributions:

– Enhancement of existing triangular quadrature amplitude modulation communication schemes by applying new codes that optimize transmission error rates.

– Development of a vehicle emissions monitoring system integrating hardware devices with cloud applications, demonstrating successful synergy between theory and practice.

– Creation of publicly accessible open-source repositories, facilitating future developments and improvements in related areas.

– Proposal and research of a new system based on smart contracts and distributed ledger technologies that facilitates interactions between organizations and scientists for solving complex computational problems.

In conclusion, the presented scientific and applied achievements demonstrate significant contributions to error-correcting codes, communication technologies, and the application of new algorithms and methods in practice, underscoring the innovative and practical nature of the candidate's research work.

3. Evaluation of Project Work and Other Activities

Assoc. Prof. Hristo Kostadinov actively participates in national and international research and educational projects. His research-related projects include involvement in the National Center for High-Performance and Distributed Computing, the National Scientific Program "ICT in Science, Education, and Security", and the task "Modern Techniques for Information Protection" under the National Scientific Program "Security and Defence". He has also worked on the project "Algebraic and Geometric Methods for Data Protection" funded by the National Science Fund and the international project OUTLAND, funded by the "2007-2013 Greece-Bulgaria" program.

He actively contributes to preparing young talents and Ph.D. students through the "Science with Education" program family, as well as internationally through projects such as "Paths to Successful Innovation" and the "European Competition for Young Scientists".

1. Conclusion on the Candidacy

The scientific achievements of Assoc. Prof. Hristo Kostadinov meet the requirements of the Act on Development of the Academic Staff in the Republic of Bulgaria, the Regulations on its implementation, Regulations on the Conditions and Order for Acquiring Scientific Degrees and Occupying Academic Positions at BAS, and the specific requirements of the Institute of Mathematics and Informatics. The presented results sufficiently meet the minimum national and institutional requirements in the professional field, and no plagiarism was found in the submitted scientific works for this competition. I give my **positive evaluation** of the candidacy.

II. OVERALL CONCLUSION

After reviewing the materials and scientific papers submitted in the competition, analysing their significance and scientific, applied, and practical contributions, I find it reasonable to give a positive evaluation 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 Hristo Nikolov Kostadinov be appointed to the academic position "Professor" in the Area of Higher Education: 4. Natural Sciences, Mathematics, and Informatics, Professional Field: 4.6. Informatics and Computer Science, Scientific Specialty: Informatics (Data Protection, Internet of Things).

Sofia

October 31, 2024

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