OPPINION

by Corresponding Member of BAS, DSc. Svetozar Dimitrov Margenov,
Professor at IICT-BAS,
on materials submitted for participation in a competition
for holding the academic position "Professor" at Department "Scientific Computations with Laboratory for 3D Digitalization and Microstructure Analysis" at IICT-BAS
in professional field 4.5 Mathematics, scientific specialty
"Computational Mathematics"

In accordance with Order №132/13.05.2022 of the Director of IICT, I have been approved as a member of the scientific jury under the competition for professor, published in the State Gazette (issue 21/15.03.2022). Documents for participation in the competition were submitted by Dr. Stanislav Nikolaev Harizanov, Associate Professor in IICT-BAS.

1. Brief biographical data

Assoc. Prof. Dr. Stanislav Nikolaev Harizanov graduated in 2005 from Sofia University "St. Kliment Ohridski", Faculty of Mathematics and Informatics with a Bachelor's degree in Mathematics. In February 2008 he received a Master's degree in Mathematics from the Jacobs University, Bremen, Germany, where in 2011 he defended his PhD dissertation under the supervision of Prof. Peter Oswald. The topic of Dr. Harizanov's dissertation is "Analysis of nonlinear subdivision and multi-scale transforms". From 2009 to 2011 he was a research associate at Jacobs University, and from 2011 to 2013 he was a postdoctoral fellow at the University of Kaiserslautern and the Fraunhofer Institute of Industrial Mathematics. Since 2014, Dr. Harizanov has been working at IICT-BAS, where in 2018 he was elected Associate Professor. Since 2016 he has a second position at IMI-BAS, where since 2018 he is also an Associate Professor.

2. General description of the submitted materials

The materials presented by Assoc. Prof. Stanislav Harizanov have been prepared in accordance with the Academic Staff Development Act (ASDA), the Regulations for the Application of the Academic Staff Development Act (RAASDA), as well as with the specific requirements in the regulations of BAS and IIICT - BAS.

They include an application, a European-style CV, a copy of an Associate Professor's diploma, a copy of a PhD diploma, lists of scientific publications and copies of the publications submitted for participation in the competition, a list of citations, a summary of the submitted scientific publications for participation in the competition- in Bulgarian and English, reference for fulfillment of the minimum requirements of IICT, reference for the original scientific and scientific-applied contributions, declaration that there is no legally proven plagiarism in scientific papers, and electronic media with information in accordance with the requirements of IICT.

To participate in the competition, Assoc. Prof. Harizanov presented 17 scientific publications covering the period 2019 - 2022, of which 6 are in journals with impact factor (including 5 in quartile Q1), 9 - with impact rank, one chapter of a book and one - in the series "Lectures on Computer Science and Technologies" of the Institute of Information and Communication Technologies.

3. General characteristics of the candidate's activity

Assoc. Prof. Harizanov is an established specialist in the field of computational mathematics. The research methodology is based on numerical analysis, approximation theory, computability and complexity of algorithms. Areas of application include characterization of objects (including biological) based on image processing, as well as classes of optimization problems. The management of 4 projects financed by the Bulgarian NSF is documented in the materials of the competition.

4. Scientific and applied scientific contributions

The presented contributions of Assoc. Prof. Stanislav Harizanov fully correspond to the scientific specialty "Computational Mathematics". They include important problems for mathematics and its applications. I accept the classification from the author's reference as follows:

I. Efficient numerical methods for solving problems with anomalous diffusion
The presented contributions are published in papers [1,2,5,7,14].

II. Nearly optimal numerical algorithms for solving large-scale problems with anomalous diffusion
The presented contributions are published in papers [1,3,4,11,16,17].

III. Applications of mathematics in biology
The presented contributions are published in papers [9,10,15].

IV. Process optimization
The presented contributions are published in papers [6,8,12,13].

Determining the scientific contribution of Assoc. Prof. Harizanov are the results in the field of numerical methods and algorithms for solving problems involving fractional diffusion in space. The spectral definition is used, which creates opportunities for preserving basic properties of the problem (conservation) when applying mesh methods for discretization. It is also important that in [13] a new preconditioning method is presented. Algorithms of optimal computational complexity for an important class of strongly coupled saddle point systems are obtained.

5. Citation of the candidate's scientific publications

The candidate submitted for participation in the competition a list of 40 citations in publications that are referenced and indexed in the databases of WoS and Scopus. In accordance with the requirements, the citations are formed in a table with data in the group of indicators Д. With a minimum required 140 points, the presented estimate of citations is 240 points. Most of the citations included in the table are in the works of foreign authors, including those published in some of the most highly ranked specialized international journals

and series. Two of the papers have a defining contribution (72.5%): (i) Harizanov, S., Lazarov, R., Margenov, S., Marinov, P., Vutov, Y.: Optimal solvers for linear systems with fractional powers of sparse SPD matrices, Numerical Linear Algebra with Applications, 25, 5, 2018 - 19 citations; (ii) Toneva, D., Nikolova, S., Harizanov, S., Georgiev, I., Zlatareva, D., Hadjidekov, V., Dandov, A., Lazarov, N.: Sex estimation by size and shape of foramen magnum based on CT imaging, Legal Medicine, Elsevier, 2018, 50-60 – 10 citations.

6. Assessment of the personal contribution of the candidate

I accept that Assoc. Prof. Stanislav Harizanov has an equal role in the joint publications.

7. Critical remarks

I have no critical remarks on the merits of the materials presented by Assoc. Prof. Stanislav Harizanov on the competition. They fully meet the requirements of ASDA, RAASDA, as well as the specific requirements in the regulations of BAS and IICT - BAS, as follows: Group A: 50 points with a minimum required 50 points; Group B: 120 points with a minimum required of 100 points; Group D: 355 points with a minimum required 260 points; Group D: 240 points with a minimum required of 140 points; Group E: 383 points with a minimum required of 150 points.

8. Personal impressions

I have known Stanislav Harizanov since his inclusion in the work of the department "Scientific computations with Laboratory for 3D digitalization and microstructure analysis" in 2014. I highly appreciate his scientific and professional growth. The achieved results define him as a highly qualified specialist with a potential for leadership in capacity building and development in priority for the department scientific and scientific-applied areas. His experience in working with gifted students from the national mathematics teams is a prerequisite for future successful supervision of PhD students.

9. Conclusion

After getting acquainted with the materials of the competition, the complex evaluation of the qualities of the candidate presented in them, including scientific and applied contributions, **I strongly recommend Associate Professor Stanislav Nikolaev Harizanov to be elected to the academic position of "Professor"** for the needs of the department on "Scientific Computing with Laboratory of 3D Digitalization and microstructure analysis" at IICT - BAS, in professional field 4.5 Mathematics, scientific specialty "Computational Mathematics ".

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