

O P I N I O N

by Assoc. Prof. Rumen Kostadinov Uluchev
Faculty of Mathematics and Informatics
Sofia University St. Kliment Ohridski

Regarding: application for the academic position Professor
in Department of Scientific Computations with Laboratory on
3D Digitization and Microstructure Analysis,
Institute of Information and Communication Technologies – BAS

Professional Field: 4.5. Mathematics

Scientific Subject: Computational Mathematics

Applicants: Assoc. Prof. Stanislav Nikolaev Harizanov, PhD

1. Documents submitted to the reviewers

I present the evaluation below in my capacity as a member of the Scientific Jury appointed by an Order № 132/13.05.2022 of the IICT–BAS Diector, regarding application for a Professor position at IICT–BAS in Professional Field 4.5. Mathematics. The procedure has been announced in the State Gazette issue 21 dated March 15, 2022, as well as in IICT–BAS website.

The only candidate applied for the position is Assoc. Prof. Stanislav Nikolaev Harizanov, PhD, from IICT–BAS. I confirm that the Candidate submitted files with copies of all necessary applicable documents which include: application form; Europass CV; copy of Associate Professor diploma, copy of PhD diploma; certificate of work experience in speciality; list and copies of scientific publications which are different than the works used in procedures on awarding PhD degree and electing in Associate Professor position; list of citations of Candidate's publications; summaries of the publications presented for the competition (in Bulgarian and English); information on the original scientific and scientific-applied contributions; declaration that there is no legally proven plagiarism in the works presented by the Candidate.

2. Biographical data in brief

Stanislav Harizanov graduated BSc degree in mathematics at FMI–SU in 2005. Later he graduated from Jacobs University Bremen (Germany) a MSc degree in 2008 and a PhD degree in mathematics in 2011. He had started his career as a researcher in Jacobs University Bremen and have continued with a postdoc in Kaiserslautern

University, Assistant Professor position in IICT-BAS (and IMI-BAS), Associate Professor position in IICT-BAS (and IMI-BAS) since 2018 to present.

3. General characteristics of the research and applied activities

In general, the results of the Candidate fall in the scope of applied mathematics. There are 17 works presented particularly for the current competition:

- 6 publications in journals with Impact Factor (total IF: 16.522);
- 9 publications in journals/series with SJR;
- 1 chapter in a book referred in SCOPUS;
- 1 lecture notes published by IICT-BAS.

The Candidate has papers published in high ranked international journals, e.g. *Computers and Mathematics with Application*, *Fractal and Fractional*, *Mathematics and Computers in Simulation*, *Mathematics* (all in Q1 quartile) etc., in *LNCS*, *LNCSE*, *LNN* series of Springer Publishing, and in *AIP Conference Proceedings*.

The scientific results of the Candidate can be classified in four directions.

(i) Numerical methods for problems with fractional degree of the diffusion operator. New numerical methods and algorithms for solving problems on fractional diffusion with various boundary conditions are developed in [1, 2, 5, 7, 14] (the numeration is according to the Candidate's list). The keystone is to find a best uniform approximation of x^α , $x \in [0, 1]$, with rational functions (BURA). Alternative effective methods are investigated, too.

(ii) Numerical algorithms for large-scale problems with fractional diffusion. In [3, 4, 11, 17] the algorithms in (i) are compared with another three alternative approaches for solving problems with fractional diffusion and it was shown the advantage of BURA method with respect to the effectiveness. Also, a few modifications of BURA method are investigated theoretically and numerical experiments are presented in the papers.

(iii) Application of mathematics in biology [9, 10, 15]. New mathematical model for the dynamical spread of COVID-19 in Bulgaria was developed in [9]. Subsequently the model was modified by using additional parameters in the differential equations in order to take into account the vaccination of the population [15]. In article [10] a new method for reconstruction of a human face on the basis of skull information was proposed and investigated. The method is of hybrid type, making balance of the methods using only Euclidean metric and only Hausdorff metric, by varying an appropriate parameter having explicit geometrical meaning.

(iv) Process optimizing [6, 8, 12, 13]. In these publications various practical problems are considered and optimal solutions are found: optimal energy management in a building [6]; comparison analysis by experiments on fuzzy images by using parallel computer frames [8]; analysis of usefulness in a distributed information system, for early detection of anomalies the operation [12]; finding the optimal computational complexity [13].

I have not found and I am not aware of any evidence of scientific plagiarism in the Candidate's publications.

The Candidate is an active member of scientific teams in national, bilateral and international joint research projects, as well as a leader for some of the projects. For his outstanding work in the field of mathematics, information and communication science and technologies Stanislav Harizanov has been awarded prizes.

The contributions and activities of the Candidate for the applicable groups of indicators „B“, „Г“, „Д“, „E“, are evaluated to 120, 355, 240 (or at least 150, see below item 4), 383 points, and all they exceed the minimal bounds for IICT-BAS, which are 100, 260, 140 и 150 points, respectively.

In addition, the candidate's engagement with young mathematicians and students makes me an excellent impression. Since 2018 he is a guest lecturer at FMI-SU, teaching students a course on convex analysis and its applications in image processing. Since 2019 he trains the Bulgarian national high school mathematics teams and is a team leader when our teams participate in international Olympiads.

4. Impact of the Candidate's scientific publications

The Candidate provides a list with 40 citations in referred and indexed publications in WoS and SCOPUS of only 4 of his scientific works. One of the papers is cited 19 times, another one is cited 10 times, third one is cited 6 times and the fourth paper is cited 5 times. Let me mention that in the very short list of 4 Candidate's works, the second and the fourth are cited in journals which main field is not mathematics, although the articles there use mathematical methods and algorithms. However, the citations of the first and the third Candidate's paper are in mathematical journals and these citations give 150 points, i.e. greater than the necessary quantity of 140 points for indicator „Д“ of the respective minimal bounds for IICT-BAS.

5. Evaluation of Candidate's personal contribution

I believe that the candidate's personal contribution is undisputed, both in the publications presented and in the other national and international activities in which he has participated. All 17 publications submitted for the competition are co-authored, which is the usual manner of doing research in the field. As there are no additional materials submitted, I accept the co-authors' participation in their joint publications as equal.

6. Conclusion

The aforementioned evidences provides me with a **positive conclusion** regarding the capabilities of Assoc. Prof. Stanislav Harizanov, to obtain habilitation to the rank of Professor at IICT-BAS. The Candidate covers the requirements of the Academic Staff Development Act in the Republic of Bulgaria (ASDARB), the Regulations for ASDARB, and respective Regulations for BAS and IICT-BAS.

That is why I firmly recommend to the Scientific Jury to propose IICT Scientific Council to elect **Assoc. Prof. Stanislav Nikolaev Harizanov, PhD**, in **Professor** position at IICT-BAS in Professional Field **4.5. Mathematics**, Scientific Subject **Computational Mathematics**.

July 13, 2022

НА ОСНОВАНИЕ
331А