O P I N I O N

By Prof. Dr. Todor Vassilev Gurov

Institute of Information and Communication Technologies

Member of the Scientific Jury constituted Order № 241/01.10.2019

Of the Director of the Institute of Information and Communication Technologies at the Bulgarian Academy of Sciences

to

Assoc. Prof. Dr. Pencho Genov Marinov

Regarding the competition for occupation of the academic position "Professor" in the Institute of Information and Communication Technologies at the Bulgarian Academy of Sciences

In the higher education area 4. *Natural Sciences, Mathematics and Informatics,*

Professional field 4.5 *Mathematics*, scientific specialty *"Mathematical Modeling and Application of Mathematics"*

Announced in State Gazette (issue 59 of 26.07.2019)

For needs of Department "Parallel Algorithms"

1. *Brief biographical information*

Assoc. Professor Pencho Marinov was born in 1955. In 1980 he graduated from the Faculty of Mathematics and Mechanics at Sofia University "St. Kliment Ohridski" holding a Master's Degree in Mathematics with specialization in Mathematical Modeling. In 1993 he defended his PhD thesis entitled "Algorithms for approximation with rational functions about the Hausdorff distance" and received the Doctor degree in specialty 01.01.13 (Mathematical modeling and application of mathematics).

His entire work experience is within the structures of the Bulgarian Academy of Science (BAS). Pencho Marinov tarted as a mathematician in 1980 at the Central Space Research Laboratory (CSRL-BAS) and from 1985 to 2001 he has worked as a research fellow at the Central Laboratory for Parallel I Processing (CLPP-BAS). In 1993, he had haved a 4-month specialization at Columbia University of South Carolina, USA. Since 2001up to now he has been associate professor at the CLPP-BAS, IPP-BAS and IICT-BAS.

2. *General description of material presented*

Assoc. prof. Pencho Marinov participates in the competition with all the necessary documents in accordance with the Law for Development of Academic Staff in Republic of Bulgaria (LDASRB), the Regulations for the Application of the LDASRB, the Rules and Conditions for the

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Acquisition of Academic Degrees and Occupation of Academic Positions (RCAAD&OAP) at BAS, and the specific conditions of IICT-BAS.

Full text of 33 scientific articles are presented for review in this competion, in which assoc. prof. Marinov is a coauthor. All they are visible in the world databases - SCOPUS and/or Web of Science and they are published after the competition for associate professor (2001). All papers have Impact Factor (IF) and they are grouped on the quartiles as follows:

- 6 are from Q1 [1, 2, 3, 29, 30, 33];
- 10 are from Q2 [4, 5, 12, 18, 19, 22, 23, 24, 25, 32];
- 13 are from Q3 [6, 7, 8, 9, 13, 14, 15, 16, 17, 20, 27, 28, 31];
- и 4 are from Q4 [10, 11, 21, 26].

A list of 143 citations of 4 publications is presented, which participates in the scoring of indicator "D" of the special conditions of IICT-BAS for the acquisition of the academic position "Professor". All citations are visible on SCOPUS. The author's h-index is 10 of the all visible articles in SCOPUS.

Assoc. Prof. Marinov has been supervisor of a PhD student who successfully had defended his PhD thesis. He had been a coordinator of 2 successfully completed national projects funded by the NSF. He also was a member of a team in 8 national and 9 international projects.

TABLE 1: Credits covered by applicant and minimum required credits for the academic position "Professor" in professional field 4.5 "Mathematics" at IICT-BAS

Group of indicators	Number	Credits covered by assoc. prof. Marinov	Minimum required credits for "Professor"
A (PhD dissertation)	PhD Dissertation - 1	50	50
B (publications, monographs)	6 papers [1-7]	290	100
C (publications)	27 papers [8-33]	896	260
D(citations)	143 citations	858	140
E (PhD Students, projects, etc.)	9- international projects, 10 national projects, 1 PhD student	325	150
		Total: 2419	Total: 700

3. *General characteristics of the Scientific and applied-scientific contribution of the applicant*

The applicant's scientific and scientific-applied activity is in the field of competition. The author's reference for the contributions of Assistant Professor Pencho Marinov is written clearly and

systematically, describing the main contributions to the works. A brief summary of each of the attached publications is presented, separately.

The candidate has classified the main contributions from his research activity into the following five thematic groups:

- **Space physics problem models and algorithms [1-9, 13, 14, 15, 17, 20, and 28].**
- **Development of algorithms for best approximations with rational functions and their application to problems with fractional partial derivatives [30, 33].**
- **Tasks in the field of inter-criteria analysis and index matrices [29].**
- **Tasks for processing data from brain activity records [25, 26].**
- **Efficient use of the grid infrastructure through a workflow of thousands computational tasks (jobs) and gaining new knowledge about the behavior of plasma in fusion reactors [10, 11].**

Associate Professor Marinov's scientific work shows that he has extensive knowledge in the field of mathematical and computer modeling of complex processes and phenomena. The applicant is well versed and effectively applies the numerical algorithms in his work to distributed computing systems located in Grid infrastructure.

The papers in the first thematic group occupy most of the candidate's research. On the one hand, they are developing new realistic models describing processes in the ionosphere, and on the other, applying a variety of numerical apparatus in the construction of the relevant algorithms, for example, spline approximations, multidimensional polynomials constructed by Chebyshev and trigonometric basis functions, which are in a 5-dimensional space consisting of: solar activity (F10.7), month of the year, local time, longitude and latitude.

In the other thematic groups, the applicant demonstrates deep knowledge in formulating and solving a new type of "transport problem" by interpreting the index matrix, applying intercritical analysis combined with Pearson and Spearman correlation analysis, and image processing.

The applicant's works have been published in renowned international scientific journals such as: Advances in Space Research, Acta Geophysica, Journal of Space Weather and Space Climate, Brain Research Bulletin, Biochimica et Biophysica Acta , Journal of Computational and Applied Mathematics, etc.

4. Reflection of the applicant's work in the works of others authors. Numerical indicators.

Over the years, the scientific work of the candidate has not gone unnoticed by scientists working in their respective fields. He participated in the competition with 143 quotations colected from 4 of his articles [3,4,5,6]. All citation papers are visible in Scopus and they are from the period after his habilitation for associate professor. The credits (indicator D) are 858 (see Table 1), which is 6 times more than the minimum requirements need of the candidatte to present a list of quatatons. However, this is not all the quotations of Assoc. Marinov. He additionally provided a table listing all 322 citations of his 62 articles, visible in Scopus, as well as a table of references to his most cited 15 articles, which for the past 10 years has collected 250 citations. Almost all citations are in

the works of foreign authors, published in a number of the most reputable specialized international journals and series with IF and SJR index.

5. *Evaluation of the applicant's personal contribution*

Although all scientific publications submitted for participation in the competition are co-authored (in this field it is natural to work in teams), the personal contribution of the candidate is beyond doubt.

6. *Critical remarks*

I don't have any substantial remarks about the materials presented by the Assoc. prof. Pencho Marinov in the present procedure.

7. *Personal impressions*

I have known associate professor Marinov as a colleague at the institute for more than 30 years, where he works as an erudite and competent specialist in the field of mathematical modeling, numerical methods and parallel programming. I have a great impression of his competence, his ability to work in a team and pass on his knowledge to younger colleagues. He is always responsive and tolerant, and his extensive life experience allows him to help his colleagues with the difficulties they encounter in life.

CANCLUSION

The documents and materials, presented by Assoc. Prof. Pencho Marinov, meet all requirements of the Law for Development of Academic Staff in Republic of Bulgaria (LDASRB), the Regulations for the Application of the LDASRB, the Rules and Conditions for the Acquisition of Academic Degrees and Occupation of Academic Positions (RCAAD&OAP) at BAS, and the specific conditions of IICT-BAS.

The results achieved by Assoc. Prof. Marinov in the research activity are completely consistent in terms of the accepted indicators. Sometning more, they exceed in few times the specific requirements of IICT-BAS for occupying the academic position of "professor".

After getting acquainted with the materials for the competion and the applicant's qualities, **I give my positive assessment and recommend** to the Scientific Jury to prepare a report-proposal to the Scientific Council of IICT-BAS for the selection of Assoc. Pencho Marinov at the academic position "Professor" at IICT-BAS in the professional field in the professional field 4.5 Mathematics, scientific specialty "Mathematical modeling and application of mathematics".

08.11.2019 г.

Sofia

Signature: ....

/Prof. T. Gurov/