REPORT

for competition of academic position of 'Professor' for the needs of IICT - BAS,
announced in State Gazette issue 59/26.07.2019.
Professional direction: 4.5 'Mathematics',
Speciality: Mathematics modelling and application of mathematics

by a member of the Academic Jury, Prof. Dr. Sc. Eugenia Stoimenova from the Institute
of mathematics and informatics - BAS

I am presenting my report related to this procedure as a member of an Academic Jury,
formed with Order No. 241/01.10.2019 of the Director of IICT. One applicant has presented
the required documentation for participation in the procedure: Associate Professor Pencho
Marinov.

1. General description of the presented materials

Assoc. Prof. Dr. Pencho Marinov presented 33 scientific publications for participation
in the competition. All of them have been published in specialized international scientific
journals since 2003 and are published after his election for Associate Professor in 2001.
The articles are grouped by the impact factor as follows:

- 6 articles are in Q1 category of Impact factor journals
- 10 articles are in Q2 category of Impact factor journals
- 13 articles are in Q3 category of Impact factor journals
- 4 articles are in Q4 category of Impact factor journals

The list of 143 citations provided is for 4 of the papers (numbers 3, 4, 5 and 6 in the
list). The presented materials have been prepared in accordance with The Law Act for
Development of the Academic Staff in the Republic of Bulgaria (LADAS); The Statutes
for application of LADAS, as well with accordance of the specific requirements of BAS
and IICT-BAS. The reference for the fulfillment of the minimum national requirements
and the requirements of IICT-BAS for the academic position of Professor indicate that the
applicant significantly exceeds the minimum requirements for this position.

2. General characteristics of the applicant's scientific activities

Associate Professor Pencho Marinov graduated with a degree in mathematics, special-
ization in mathematical modeling from the Faculty of Mathematics and Informatics at
Sofia University "Kliment Ohridski" in 1980. In 1993 he obtained a PhD degree in mathe-
matics with a diploma from Higher Attestation Committee of Bulgaria. Since 1985 he has
been working at IICT-BAS and since 2001 he is an Associate Professor.

Assoc. Prof. Pencho Marinov is an established researcher in mathematical modeling with significant results in the fields of: high-performance systems and algorithms for parallel processing; approximation of rational functions with fractal functions with respect to the Hausdorff distance; modeling high-energy plasma in a nuclear reactor; modeling of processes in the ionosphere; heuristic algorithms for process optimization and modeling.

Assoc. Prof. Marinov actively participates in national and international research projects and is the leader of two national projects funded by the NSF.

3. Scientific and applied scientific achievements

The presented description and proofs of the scientific and applied scientific contributions of Assoc. Prof. Pencho Marinov are in accordance with the scientific specialty in Mathematical Modeling and Application of Mathematics. The candidate has classified his work into five thematic groups:

1. Development of algorithms for best approximations with rational functions and their application to problems with fractional partial derivatives.

2. Problems in the field of inter-criteria analysis and index matrices.

3. Problems for processing data from brain activity records.

4. Using the Grid Infrastructure for Plasma Behavior Modeling in Fusion Reactors.

5. Space physics problem models and algorithms.

The first group of papers includes 2 articles in Quartile Q1 of the journals in the field of scientific calculations and is co-authored with colleagues in this field. Work in this area continues within the framework of an ongoing NSF project. The articles in the second group are in collaboration with colleagues in biophysics and biomedical engineering, with Assoc. Prof. Marinov being the scientific supervisor of a doctoral thesis on the topic. The third group includes articles in the field of neurobiology and the research is done in collaboration with researchers in the field. The contributions are in the automatic localization of epileptic seizures based on brain activity records. Activity on the fourth topic is related to computer simulations of the destruction of the walls of a nuclear reactor under the influence of high-temperature plasma. The fifth group of papers contains the largest number of articles devoted to various mathematical models, including plasmasphere electron temperature and models of the distribution of electronic concentration in the ionosphere. These articles are the result of Assoc. Prof. Marinov's involvement in international projects and have been published in prestigious physical journals, including *Advances in Space Research*. The large number of citations to these articles and the practical implications testify to his contributions to theoretical and applied science.

Pencho Marinov has made major contributions to the created new mathematical models and algorithms in each collaborative research problem from different scientific fields of physics, mechanics, biophysics and biomedical engineering.

4. Reflection of the candidate's work in the works of other authors

The applicant's documents provide a list of 143 citations of 4 of the papers. All citations are in journals with IF and SJR. Indeed, the number of citations of all submitted works for the competition is much larger, but the presented ones satisfy and significantly exceed the specific requirements of IICT-BAS.

5. Impact of the candidate in collective publications

The joint publications of Assoc. Prof. Marinov with researchers from different fields show that mathematical models and algorithms are his contribution and I think that his contribution is at least equal to the contributions of the other co-authors.

6. Critical remarks

I have no critical remarks.

7. Personal impression of the candidate

I have excellent impressions of Pencho Marinov as a researcher in Mathematics and Computer Science and as a responsive colleague able to engage in new collaborations.

8. Conclusion

The analysis of the submitted materials in the competition shows that Assoc. Prof. Marinov is a highly qualified researcher who has significant contributions in the field of mathematical modeling and applications of mathematics. I believe that the set of criteria and indicators for the acquiring the academic position of 'Professor' in accordance with the LADAS and the recommended requirements of IICT - BAS are completely satisfied.

I recommend the Scientific Jury to propose to the Scientific Council of IICT to elect Assoc. Prof. Dr. Pencho Marinov as a Professor in professional field 4.5 Mathematics, scientific specialty Mathematical modeling and application of mathematics.

Sofia, November 25, 2019   Signed:

Eugenia Stoimenova

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